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The Recent Labor Troubles.

EVERY employer of labor has reason to feel an interest in the question at stake at Homestead—whether a manufacturer shall deal with his employes individually, as men, or shall contract for the help he needs with a laborers' monopoly, the trade-union. The troubles at Homestead have been forced upon public attention largely on account of the bloodshed which attended them, but the principles involved are illustrated in many other strikes now in progress or recently closed. Building operations in New York city have been practically suspended for two months on account of a strike of enormous extent, due not to any dispute over wages or length of the working-day, but to the determination of the trade-union leaders that their organization, instead of the employers, shall decide all questions relating to labor. At Homestead the contest was begun over the scale of wages, but it was easy to see that the real tug of war was to secure first place as between the Carnegie company and the Amalgamated Association.

In this country, where everybody works and the man of leisure is an exception, public sentiment is certain to be favorable to even the humblest man employed in honest industry whenever he happens to be engaged in a contest for his rights. A knowledge of this fact has emboldened a mischievous class of unscrupulous persons to impose upon the sympathies of the public, by palming themselves off as the special champions of labor and exaggerating every real grievance of honest workingmen until even the latter have been deceived. It is these professional agitators who have made most of the trouble which has found expression in strikes. They have been careful enough themselves to avoid all hardships, being invariably in the receipt of good salaries at the expense of the real workingmen. In fact their prosperous season is in the midst of the most serious trouble for the men whom they induce to go upon strikes.

The right of workingmen to organize cannot be denied in a free country. Nor can any man be forced to work, against his will, without reestablishing slavery. But while public sentiment is conceding this much, it is asked to concede, further, that whatever is demanded by "labor" is right and that any refusal is oppression to the working class. It is not strange if the wage-earners should sometimes forget to consider the rights of their employers—who are also citizens of a free country—especially when following the lead of the self-appointed guides known as "walking delegates," who have not yet developed a capacity for recognizing anybody's rights.

It remains for manufacturers to make themselves familiar with the methods of trade-unionism that they may be able to distinguish between a demand coming from their employes as men and one which has been forced upon the latter by outside influences, perhaps against their wills. It must be remembered that in an iron-bound organization the power of one man, however unwise or unscrupulous, may be absolute. It must be kept in mind, too, that nothing good can come of submitting, for a present advantage, to a single unjust demand because it is made by

"organized labor." Every advantage gained by the professional organizers will be closely followed by another demand, until the point may be reached where the founder of a great industry, who has guided it to a successful position, finds its control taken from his hands by those to whom he has given employment.

facturing in several countries in Europe. But the United States is steadily taking the lead, and doing its share in supplying the demand in new directions for new applications of India-rubber to the arts and the conveniences of life.

The Year's Rubber Statistics.

THE estimate printed in the last number of this journal, that the twelve months ending on June 30, 1892, would show a total importation into the United States of twenty thousand tons of crude rubber, has been confirmed by the latest bulletin issued by the Treasury Department upon this point. The exact figures given are 39,976,205 pounds, and the total valuation \$19,718,216. If the Gutta-percha imports are added, the total is 40,284,444 pounds. It will be necessary only to turn to the figures for 1876—the year of the Centennial Exposition—when only 10,298,000 pounds were imported, to get a striking idea of the great advancement made in the volume of this trade. If we go back only ten years, when the combined imports of India-rubber and Gutta-percha were 21,646,320 pounds, it will be seen that the advance has been steady. The most rapid growth, however, has been the last three or four years, the 30,000,000 mark in imports having been reached first in 1888.

There is a point of interest in connection with the rubber movement reported in these statistics bearing upon the growing importance of the United States in international commerce. We are getting more rubber direct than formerly, and receiving a constantly-growing amount to be transhipped to Europe. During the last twelve months the amount of our rubber imports thus shipped was 1,600,834 pounds, while the annual average shipments of this character for the preceding ten years was only 666,777 pounds.

The latest statistics are also of interest in respect to the exports of domestic manufactures of rubber, as shown below:

	Value.
Year ending June 30, 1882.....	\$ 510,716
Year ending June 30, 1883.....	569,296
Year ending June 30, 1884.....	635,046
Year ending June 30, 1885.....	680,156
Year ending June 30, 1886.....	664,304
Year ending June 30, 1887.....	834,304
Year ending June 30, 1888.....	866,867
Year ending June 30, 1889.....	831,748
Year ending June 30, 1890.....	1,090,307
Year ending June 30, 1891.....	1,236,443
Year ending June 30, 1892.....	1,416,067

Our imports of rubber manufactures have not increased materially during this time. The figures for the fiscal year just closed were:

	Value.
Manufactures of India-rubber.....	\$371,580
Manufactures of Gutta-percha.....	61,276
Total.....	\$432,856

While the marked increase in the consumption of rubber has thus been going on, it by no means indicates a falling off of the same trade in other countries. Recent extracts in the pages of this journal from reports of United States Consuls showed a steady growth of rubber-manu-

Profit-Sharing in Large Corporations.

FOR many years certain large corporations have had a system of profit-sharing with their employes, but it is only within the last two or three years that general attention has been called to this, or that American manufacturers have practised it. A large mill in Fall River, Mass., recently declared a semi-annual dividend of $3\frac{1}{2}$ per cent. on the wages paid, and will repeat it in the next six months. As a result of this experiment it has been proved that more reliable help have been secured, the production has been increased and the wastes wonderfully lessened. This practice of profit-sharing has become very popular in England, where many large firms have adopted it and found it profitable to themselves and their help. There are a variety of schemes for profit-sharing. In one of them a certain proportion of the earned profits is set aside and distributed among the workmen, according to an agreed scale, which may have for its basis either the earning capacity or length of service, or a combination of both. Another way is to have a fixed sum added to a provident sum which is contributed to by each workman, and still another method is the granting of a bonus.

The first of these systems seems to have the most general popularity and has been adopted by more firms than all the others put together. In carrying out a system of profit-sharing, the salaries are paid, allowances made for debts and liabilities, and for wear and tear of machinery and depreciation. There are also deducted dividends on preferred stock which is divided at a fixed rate for the working capital of the company and the balance of profit that remains is then divided into equal parts, one of which belongs to the ordinary share-holders and increases their dividends, and the other belongs to the employes. Of course the employes who belong to the floating class of workmen do not come in for this profit-sharing, as it is understood that only such as are employed at the beginning of the financial year shall be entitled to it. The share of the profits coming to the workers is distributed in proportion to their respective wages and salaries at the commencement of each year, without reckoning over-time or for variable allowances. The piece-workers' wages are arrived at by averaging their earnings for the last month of the preceding financial year. If for any year the share of profits to the employes should exceed a certain fixed sum the surplus goes to form an employes' reserve fund. As a rule this share of profits going to the workers is divided into three equal parts, one of which is paid to him within two months of the end of the financial year, and the other two parts are put on the books of the firm to his credit as a provident fund. It will be interesting to know if any rubber-manufacturers have as yet looked into this with a view of adopting it in their mills.

THE EVOLUTION OF THE RUBBER SOLE.—I.

By E. D. Deming.

EVEN the clear and retentive memory of our oft-quoted historic "oldest inhabitant" reaches into years preceding the introduction of India-rubber into arts useful and mechanical. The present generation has been privileged to erase their egregious blunders with chunks of rubber at a nominal cost. And what a comforter the discovery of the expurgating qualities of caoutchouc must have been to the young sketch book artists of the early years of the present century. Happy the artist who could afford a three-shilling conical-shaped "rubber" to erase those aggressive lines so determined to shape themselves into an ugly bull-calf, when the young artist really wished to represent a docile, sleek and gentle family milch cow!

I am of the opinion that Deacon Converse, of the Boston Rubber Shoe Co., would give a controlling interest in his ventilated tennis-sole for a single lost art of the South Americans—the secret the Peruvians possessed for rendering copper as hard and keen as steel. Yet the ancient Peruvians, possessing this great art, found no use for caoutchouc, unless the gum may have been used to make their *balsas** impervious to air and water. And it seems more likely that some bituminous substance was used for this purpose.

The ancient Mexicans did, however, possess a knowledge of rubber, for they made rubber balls which "bounced better than the wind-balls of Castile."† There is very little in history concerning even the rubber ball of ancient Mexico. I am not prepared to say the league base-ball teams of the Aztecs sported a regulation India-rubber ball. There is no known authority that would sustain me in digressions of this character. It appears historically certain that the base-ball shoe with a rubber sole was not one of the freaks of fashion in Montezuma's day. We read in history‡ that "the nobles wore shoes worked with gold and jewels and soled with leather." The poorer people walked upon soles made from the palm tied to their feet with thongs.

Soles of gold! The most precious that ever adorned the feet of king, prince or potentate protected the soles of the feet of Montezuma as he was borne by his nobles within his royal palanquin, blazing with burnished gold, to meet Cortez. Obsequious attendants "strewed the ground with cotton tapestry," that his imperial soles of gold "might not be contaminated by the rude soil." But Montezuma's kingdom perished and the soles of solid gold perished with it.

The rubber sole is a comparatively late innovation—the rubber boot a discovery of more recent years. The mechanical uses of rubber only date back a little less than

three-quarters of a century. Thomas Hancock, of Newington, England, in 1820, took out a patent for the use of India-rubber for wrists in gloves and for garters, while Macintosh, of Glasgow, in 1823, was applying his discovery to the fabrication of waterproof garments. E. M. Chaffee, of Roxbury, Mass., patented the first rubber boot May 17, 1834, its sole combined with leather to make it durable, while Charles Goodyear, of New Haven, was grappling with his vision of vulcanization which became a reality of reason in 1839 by a simple accident. Later boots were made by his process and finding their way to England, Hancock analyzed them, discovered the essential elements of Goodyear's secret, and while the latter was lifting himself out of the fog and mist of a dreary delirium to a living principle, patented the process in England. If the soul spiritual can take on the material the soul of Goodyear must be encased in rubber throughout an endless eternity, for no man ever labored more industriously to solve a principle than Charles Goodyear.

A single pair of rubber overshoes to fit various sizes of boots! Such an idea was brought out by a New Jersey gentleman in 1851. The advantage of such an invention may not appear clear to the present generation, when a pair of rubbers may be had for fifty cents. Perhaps Mr. Day was a man of economical conceptions, and proposed making one pair of rubbers answer the purposes of a large and interesting family. Still it might seem that the idea was establishing a dangerous precedent. It would not be safe to kick off such a pair of rubbers in the ante-room of a lecture hall on a rainy, slushy night, and expect to find them again. Mr. Day's invention was to do away with cloth entirely. Separate pieces of pure rubber of varying degrees of elasticity were to be substituted. Each separate piece of rubber was to possess its own graded degree of elasticity as the movements of the foot required, the same to expand and contract in every direction assuring adjustment to the slim or broad boot and boots of different sizes. But the sole was the stubborn element which threw obstacles in the way to the crowning glory of the inventor's skill. The sole would not properly adjust itself.

In 1853 Messrs. J. Chilcott and R. Snell, of Brooklyn, brought out jointly a sole of three parts, consisting of an India-rubber sole, a leather lining and a leather border or edge. The rubber sole was made smaller than the sole it intended to cover, having its edges beveled off thin. The leather lining or sole was the size of the boot or shoe it was to fit, being united to the upper side of the India-rubber sole by a waterproof adhesive cement. The leather border or edge was of the same thickness as the rubber sole and overlapped the beveled part of it, beveled in a manner to make the outface level with the rubber, the edges covered and protected by leather and united with it by waterproof cement, forming a hard sole impervious to

* A small boat sometimes made of the skins of seals, used by the ancient Peruvians.

† Harrah's account of Columbus's second voyage.

‡ Prescott's "Conquest of Mexico."

water. It could be secured to the boot or shoe by sewing, pegging or cementing.

Mr. C. McBurney, of Roxbury, Mass., in 1859, brought out a vulcanized sole of India-rubber, having the holes for pegs or nails formed in it at the time of vulcanization by suitable pins in the interior of the molds. A number of these soles were put upon the market, but were much more expensive than soles of to-day. They were found quite practical on slippery decks of vessels and in other damp places.

In 1863 Theodore C. Weeks, of Boston, produced an India-rubber sole which had tacks imbedded in it for fastening the sole to the upper. The tacks were passed through first a metallic tack-head holder, "vulcanizing

the tack-holder and the tacks embedded in the rubber, with the points of the tacks protruding therefrom." Lewis Elliott, Jr., of New Haven, obtained several patents on rubber shoes and soles. In 1866 he brought out a sole with the layer of rubber smaller than the surface of leather, leaving a marginal strip of the latter for sewing, the two united by vulcanizing the rubber while the two layers were associated under pressure.

I have thus made mention of nearly all the rubber shoes and soles which had been brought out to the close of the civil war. Soles of rubber were yet in their infancy and the tennis sole did not appear until a few years since, which will be illustrated in due time.

[TO BE CONTINUED.]

THE MANUFACTURE OF INSULATING COMPOUNDS.

By Ralph W. Gray.

WITH the growth of electrical industries there has come a large business in insulating, not only for wire-covering but for special appliances for insulated fixtures that are parts of an electrical plant. Quite a variety of small molded insulators are made and most of them are simply improvements on the old-fashioned glass-insulators, types of which are shown in the cups on every telegraph-pole. Most of these that are made of compounds are molded from a variety of substances such as mica, soapstone, silica, lava and like substances. Where the body of the compound is made from substances which come from the earth, the first necessity is to reduce it to a powder, which is done by running it through a crusher, then through a pulverizer and then through silk bolting-cloth, after which it is deposited in a receptacle which is close to the mixing-tubs. These mixing-tubs are arranged on various principles, some of them being like a churn in a rubber factory, others being nothing more or less than friction-rolls such as rubber dough is mixed upon. Indeed, the whole business is quite similar to the mixing of rubber compounds, which in turn has been described as being almost parallel to the bread-mixing business. The compound when thoroughly mixed is a plastic dough, very much shorter and more brittle than the rubber dough would be. This is calendered by small pressing-rolls and then the sheets are cut up into various forms most convenient for filling the molds. In some works the molds are filled by hand and the pressing and vulcanization done as it is in rubber works, in others the sheets from the calender feed directly into a hydraulic machine which presses the compound into shape and sets it at once. Where a compound of this kind is used a great quantity can be turned out in a day and the work is almost as simple as making school crayons. For tube-work these compounds are run through an ordinary tube-machine, and if the compound is tenacious enough, may be manufactured into tubes of almost any length or any thickness of wall and size of diameter.

The manufacture of insulated-wire coverings is con-

ducted in a variety of fashions. Much of the machinery as well as processes having originated in the factories that produce the goods. Processes and machines are usually jealously guarded from the public eye. The simplest form of insulation known, for ordinary work, is a cotton braid which is put around the wire in much the same manner that the covering for a whip is braided, although these braiders run at a higher speed and are built practically for this work. The cotton thread is treated with a variety of insulating materials, the idea being to get something that is waterproof and weatherproof. In some of this wire-work the wires themselves are so small that they are less in diameter than a single hair on the human head.

What are known as tape-covered wires are covered with one, two or three tapes which are wound by an automatic machine outside of the braid covering, the tapes being treated before and after winding with a waterproof compound. This tape is cut by a tape cutter from various fabrics, linen perhaps being the best, and is often soaked with asphaltum. Ozokerite has been used for this same purpose and paraffine is also recommended. Rubber-manufacturers are making a rubber compound, using a fair grade of gum and quite a quantity of ozokerite, which makes an extremely good filling for braids. This filling by the way, can be either put on by the knife process in solution, or it may be frictioned in the cloth and covered later with a good varnish. Some manufacturers make two- and three ply coverings in a braiding-machine that is similar to the hose-braider, treating this for insulating purposes with their own compounds. When it comes down to the manufacture of rubber compounds for insulating wire there are a variety of processes and ingredients employed. Some use a small amount of pure Pará rubber with just enough sulphur to vulcanize, others have used Pará rubber with sulphides of certain of the heavier metals as a vulcanizing agent. Other wires that have good reputations are made of a rubber compound with infusorial earth, zinc-white, devulcanized rubber and certain of the more tenacious rubber substitutes.

It might be well to note just here that ordinary rubber substitute is not applicable for this sort of work. A rubber substitute for molded work should have a light velvety feeling after vulcanization, for insulated wire; however, it needs to be more in the line of a sulphur substitute which is not as lively but has very great lasting qualities. Whenever these substitutes are used, they should be thoroughly washed from acid and there should be no chloride of sulphur present. As a rule the vulcanizing is carried on in upright vulcanizers where live steam is admitted to the coils of rubber-covered wire wound on great spools to keep in shape.

The color of insulated-wire compound is not necessarily any test as to its quality. A white, black or red compound may be an exceedingly good one, or it might be an equally poor one. The red is apt to be unsatisfactory if the ordinary oxide of iron is used in the coloring matter. An antimony color, however, gives excellent results, particularly if the compound has not been overcured. Indeed in speaking again of vulcanizing, the manufacturers are careful not to vulcanize their covering any more than is absolutely necessary, as time will produce a certain oxidation in the best of compounds, and the less they are vulcanized the longer they will stand. It is hardly necessary to describe the process of washing, mixing or calendering in

insulated-wire factories, as it is identical with that used in usual rubber work. The process of covering the wire, however, is original to this line of manufacture. The wire, after being straightened by a patented straightening-machine, is usually coated with tin that any possible sulphur in the rubber compound may not affect the copper. It is then run through a tubing-machine made particularly for this kind of covering and the gum is forced upon it, making a continuous solid cord with the wire in the center. Some kinds of insulation put an unvulcanized compound next to the wire, as in this they are obliged to use sulphur. The compound contains, however, such dryers as litharge, magnesia, as much silica, or infusorial earth, which is an excellent insulator, as the rubber will stand. The amount of sulphur used in the covering that is vulcanized runs all the way from 6 to 20 per cent. of the weight of the gum. The latter amount is, however, very rare, and is to be deprecated as it is simply put in to make a quick cure and the result is apt to be unsatisfactory. Taking the average rubber-covered wires manufactured through the United States the average proportion of Pará rubber to the compound may be stated as about thirty per cent., which, considering the fact that rubber is able to absorb such quantities of compound, is a fine showing.

RISE AND PROGRESS OF THE RUBBER MAT.

By I. A. Sherman.

THE history of the rubber mat dates back to antebellum days, when almost all of the now staple articles in the business were fighting their way upwards. It received an impetus in the good times following the close of the war, and became fairly indispensable in the last decade. At the time with which this account begins the cloth mat was as popular as it was dirty; an eyesore in its dilapidation to the customer, and in its filthiness a flattened symbol of the neglect of the office-boy. The iron or steel mat rose and fell in more recent times, and the extent of that business, which employed large manufactories exclusively in its day, was a goad to the rubber-man who had shown to him the great possibilities of a mat so convenient and so economical in its use as that which could be formed of rubber.

Before the war, E. M. Chaffee—a name highly honored in Rhode Island—took out his patent, the pioneer in that line in this country, for the "Diamond" mat. A company under the name of Bourne, Brown & Co., was formed to manufacture this mat, and from it sprang the National India Rubber Co., of Bristol, R. I., who yet make this particular line of goods in immense quantities. The corrugated mat came along a little later and the perforated mat has been made in this country for more than a score of years. This is now one of the most popular of mats, and rubber-men who have measured off many years in the past in following in the footsteps of Charles Goodyear speak of the history of its recent extended introduction with regret.

An Englishman, five or more years ago, landed in this country, and visiting bar-rooms and kindred places, explained to the proprietor, as he quaffed his Bass, the advantages of the perforated mat. He did it so well that before our more temperate rubber-men "caught on" to him he had placed these foot-wipers into the best places, and into a great many of them, too. Startled by his success, the domestic manufacturer put his wits in play, lowered his prices, and although in the first heat he had been distanced in the race, he came in first in the second contest, and has kept the lead ever since. The great point in favor of the perforated mat is that it can be made in any size, including dimensions hardly practicable in other forms of mats which are made in a press.

The corrugated mat is without protection; the New York Belting and Packing Co. having patented, however, a design of a sweeping character, which, while it has been decided in one court in favor of that company, after once having been thrown out on a demurrer, is taking its turn in the higher tribunals for final decision. This was the patent of George Woffenden, dated May 27, 1879, the struggle over it having gone on nearly all the time since that date.

The volume of the rubber-mat trade is so large that manufacturers can only guess at its extent. It probably stands next to the bicycle-tire line. If any manufacturer stated his consumption, the inquisitive mathematician would soon figure out the quality of the goods coming from that

particular mill. This is ever a drawback to the party hunting for statistics in any line of rubber goods, as mill-men guard the secrets of their compounds with a mental watchdog, superlative in his fidelity.

At first the mats were made pure to 95 per cent., Pará coarse being the grade chiefly used. Then the "shoddy" man, in his Mephistophelian way, beguiled the rubber-man into an easy way of meeting competition, and successively 10, 20, 30 and more per cent. of rags were used, and now the amount incorporated by some mills is told with a wink, gossipped from one to another with a smile, and accuracy in statement has yielded to imagination. Prices, however, have gone down in twenty years 50 per cent. for diamond and perforated sorts, and 66 per cent. for corrugated. It is known to some in the rubber business that shoddy does not mix permanently with fine grades of rubber, the latter continually working to the surface and enveloping the compound. Many a mat wears satisfactorily for a time, longer or shorter, according to the percentage of the compound in it, but when the coating does go, that which is left is little better than the rag mat which we long ago un-

dertook to discard. Some mats, however, have proved their worth in the test of time, the Pennsylvania Railroad in Philadelphia having used one for over a score of years over which whole populations have repeatedly tramped.

The uses for rubber mats are numerous—for floors, treads, pitchers, cuspidors, dentists' chairs, barber-shops; for glasses, coin change—in fact a new use is being found for them where there is moisture or dust, and cleanliness is desired. Easily handled and readily cleaned, they seem unapproachable wherever their use is practicable. New designs and forms are constantly being worked out, chiefly in the border and the points of solid-back mats, and differences in the cuttings of the perforated. In the latter there are now skilful workmen employed by all the large factories, who cut with their punches rapidly without previously drafting the design, a rapid way when compared with the careful measurements thought necessary a few months ago. Colors, initials, monograms and other extras are punched out, and this has obtained as a fad in the popular resorts. All in all, the mat business is full of possibilities, now in the time of its youth, with a long life of promise.

THE RUBBER-COVERED ROLLER.

THE rubber-covered roller is nothing new, being over a quarter of a century old, but the full appreciation of its worth has only been reached within the past four or five years. It now finds a constant and extensive use in squeezing water, dyes, acids, etc., from cotton and woolen yarns, and textile fabrics in bleacheries, print- and dye-works, cotton- and woolen-mills, also for press-, size- and couch-rollers in paper-mills, and in wool-washing, leather-splitting, unhairing, and tobacco-squeezing machines. It is a manufacture well concentrated in one or two concerns, for although the patents upon the processes have long since expired, it is found to be a business requiring much peculiar skill, and that which is only obtained by time and experience.

In the paper-mill the rubber roll has now reached a point where it seems to be indispensable. In the press-roll there is a great saving effected in felts, the latter running always twice, and sometimes three and four times as long as they formerly did when wood and metal rolls were used. In size rolls the surface, when covered with rubber, is of the same elasticity throughout, and a former trouble is obviated. The experience then was that the grain, knots, and constant chipping on the surface of the wooden rolls were an endless source of annoyance. In top couch rolls in wet machines which are made of a light rigid iron shell, with a covering of soft rubber, the necessity of using felt wrapping is obviated, and as the rubber-covered rolls do not harden at the ends, they give more satisfactory results with less attention than those which they have displaced.

The top couch rolls for cylinder paper machines and Harper Fourdriniers are run with or without a jacket, and their great elasticity is their qualification.

The bottom couch rolls do away with many wires, and being soft, the work of the first and second press rolls is

materially lessened, and the same elasticity is the qualification in the squeeze rolls, the work being done more thoroughly.

So on through other industries, the even work and the elasticity of the rubber forms an important part in rapid, economical and thorough work.

As the rule, and especially in the rollers of medium size, the roller has a base of cast-iron with wrought-iron bearings or journals, the larger sizes being of cast iron throughout. The surface of the iron is prepared by cutting a full thread, V-shaped and continuous, circumferentially around the body of the roller. These threads are 18 to 20 to the inch. In wool-washing-machine rollers there are longitudinal grooves planed, $\frac{1}{2}$ to $\frac{3}{4}$ of an inch deep, $\frac{1}{2}$ to $\frac{3}{4}$ of an inch wide, and 1 to $1\frac{1}{2}$ inches apart. While the symmetry of the thread is considered the best way to secure the rubber to the roller, there are cases in which the rough turning of the surface will answer the purpose. In cases where iron flanges are used on the ends of the body of the roller, air holes $\frac{1}{2}$ of an inch in diameter are drilled $1\frac{1}{2}$ to 2 inches apart through the flanges and near the surface. Where acids or chemicals are used, the ends are also covered with rubber, shielding the iron from destructive action. The rubber itself is often protected from the action of lubricating oil by shoulders placed next to the journals.

It will be gathered from the enumeration of the points which go to make up a roller that it is a business of skill and experience, but, at the same time, it is one of large dimensions. The covering of rollers with rubber received considerable attention from Hancock and Good-year, but the chief patents under which the manufacture in this country is carried on, originally belonged to James Bennet Forsyth. They have long since expired, however, and the industry is open to all.

Selling Rubber Goods in Mexico.

THE business mission to Mexico of Eugene Herbert, of the Atlas Rubber Co., of New York, has been mentioned already in this journal. He arrived in New York on August 8, and had some facts of interest with which to favor the readers of THE INDIA RUBBER WORLD.

"I visited," said Mr. Herbert, "Monterey, Saltillo, San Luis Potosi, Guadalajara, the City of Mexico, and Colima, and had a very pleasant, and for an initial trip, a successful one. The traveling was as comfortable as in the States, except between the City of Mexico and Colima. There I had a jaunt of two days in the stage, and two on the back of a mule. I found as good drug-stores in the City of Mexico as you see on Broadway, which I did not expect to see. For instance the store of La Drougerie Universal is fitted up elegantly and has a large and well-selected stock of rubber goods. The concern does a large business, having branches in Vera Cruz, San Luis Potosi and Guadalajara. It does, in fact, the jobbing trade of the country. In addition to the regular stores, rubber goods are kept by the general stores or the *merceries* as they are called in Mexico. All of these are very fine places, and the quality of the goods they keep is excellent.

"Speaking of rubber goods, there is hardly an article sold here that they do not keep in Mexico. They have manufactories which use belting and packing; on the lawns are the ubiquitous hose and reel; the boots and shoes of course are there, and druggists' sundries, naturally, are kept everywhere. Prices are high owing to the tariff and difficult transportation. Colima had to pack everything in wagons, so it did not have a variety, getting what it could, however, from the San Francisco market, whence goods are brought by steamer.

"I was very much impressed with the business men. Quite different from what I expected, they were alert and active. They generally suspend business for two hours in the middle of the day, a custom I believe in every tropical country. The climate did not seem to enervate them.

"On the road to Colima I saw some rubber plantations or *haciendas*. One man has a plantation of 400,000 acres and some of the trees are five years old, and almost ready to tap. He has to pay very little for his labor—practically subsistence and clothes—and he expects to make a good deal of money out of the venture. The land is not taxed, which is in his favor. I saw them laying a railroad near Colima, and upon examining the wood for the ties I found it to be light mahogany, the cheapest they could get. There is an active volcano near Colima which, of course, was a sight for me.

"Mexico is full of resources, but it appears to be bottled up. They have now a good harbor at Tampico which may facilitate their export trade. The inhabitants are musical. In the squares I heard beautiful music, and they are social to an eminent degree. On the haciendas they have a church and a priest and good habitations. The City of Mexico is badly drained and therefore sickly. It is in a basin, not readily permitting of good sewerage. They are now tunneling the mountain to obtain proper drainage.

"All in all, I was pleased with what I saw, and think my trip is a harbinger of good results from that country for our firm."

Cable Lines to South America.

IT is reported that the cable tolls via Lisbon to Pará will be reduced on August 16, but the officials in New York claim to be ignorant of the details. According to one report the tolls will be \$1.75 per word. There are now three routes to Pará from the United States—the Galveston, the West Indian, and the Lisbon. The tolls by the Galveston route are \$1.50 per word, the Lisbon, \$1.92 and the West Indian, \$1.95. The Galveston route is made up of a land line to Galveston, thence cable to a point below Vera Cruz, thence by land across the isthmus of Tehuantepec, and by cable South, touching at Panama and various Central and South American points, to Valparaiso, thence across the Andes to Buenos Ayres and by cables up to Pará. The weak element of this route is the land lines. In the Andes the service has been at times wretched for the reason that it was so difficult to keep up the wires. In point of impassibility of path it is probably the worst telegraph route on the globe.

Now another Transandine route has been opened, and as the eggs are not all in one basket, the service has lost considerable of its precariousness. On the Eastern coast of South America new cables are being laid on better routes. The land routes in Brazil to Pará are very unreliable. In fact in a tropical country a land line is never proposed where a cable can be used in contiguous water. The monkey will play havoc with the best intentions of a Morse, or an Edison, and the panther, the condor and large animals will break a wire or fell the poles faster than a corps of repairers can replace them. A troop of monkeys have been known to land on a wire, and in their feats of acrobaticism tear down a mile of poles and wire so that it would all have to be rebuilt. Iron poles are now used altogether. The Lisbon route is perhaps the best seasoned of the three. Going from New York to Heart's Content, Newfoundland, it crosses to Ireland, down to Lisbon and Cape de Verde, thence over to Pernambuco and up by Fortaleza and Maranhão to Pará. Naturally on this line old telegraphers are retained, and years of experience are concentrated in the handling of business.

The West Indian line is said to be excellent. Going via Key West to Havana and Santo Domingo, it is extended by easy stretches by cable along the Windward Islands, and then also by cable to Maranhão, and back to Pará. Short stretches of cable allow of greater speed in transmission and as the relays are few, the power of the capacity of this route will under careful management be large. Its tolls are high, the Western Union and its cables claiming the larger share, and in this way it is handicapped.

The reduction of tolls to South America will, if it comes, be of great advantage to the rubber trade, as that class of merchants, together with the tin, hemp, tea and coffee broker have much to complain of in these days of necessary quick communication.

Ceylon as a Source of India-Rubber Supply.

AT the London Chamber of Commerce on Monday, July 25, Mr. J. Ferguson, the corresponding secretary to the Colonial and Imperial Institutes in Ceylon, gave an address on "Tropical Agriculture in that Colony." Dealing with the India-rubber plant, he thought there was much encouragement for the Ceylon planter to take up this product, for which he understood there was a large and growing demand at remunerative prices, especially as the prospects of the supply from South America, Africa, and the East (nearly all forest trees), was gradually falling off, or at any rate was below the requirements of manufacturers. If it was true, as he had learned, that one province of Pará in Brazil had developed an export equal to 17,000 tons per annum in a favorable year, and worth £300 a ton, or £5,000,000, all the rubber being got from systematic tapping of the trees, there ought certainly to be room in Ceylon for extensive planting experiments with a view to the supply of the future.

In Ceylon no little attention had been given to the cultivation of caoutchouc or India-rubber trees over a dozen years ago, when they had been hard pressed for products to take the place of coffee; and for some years great hopes were expressed that the industry would become a profitable and permanent one. Sample parcels of Ceylon Ceara rubber harvested from trees eight to ten years old, sold as high as 4s. per pound. But the great rush into tea, and the greater ease with which returns could be got from that product, together with the long time required by rubber trees to mature, and the greater expense in tapping and harvesting, discouraged further planting; and he could not speak of more than 450 acres in all Ceylon as now being cultivated with rubber plants, although of late years Dr. Trimer had been able to report very favorably on experiments under his direction in the Botanical Gardens, and attempts were now being made by the Ceylon Forests Department to grow the tree in jungle clearings. The Gardens had also sent plants and seeds to North Borneo and East Africa.

In Colombo they had endeavored to bring all the information about rubber into a planters' manual, and there could be little doubt that if the Ceylon garden and forest experiments went on well during the next few years, planters would once more take up the industry.

Millions Made in the Rubber Trade.

ONE of the New York daily journals has compiled a list of millionaires, from which it would seem that the rubber trade is not behind any other, in proportion to the number engaged, in affording opportunities for the acquirement of wealth. Among those mentioned in the catalogue of millionaires referred to are John H. Cheever, of the New York Belting and Packing Co., who is interested largely in mines also; Gustav Amsinck, the well-known importer; Charles R. Flint, W. R. Grace, Michael P. Grace and John W. Grace, in the South American trade; John R. Ford, of the United States Rubber Co., and John D. Vermeule, of the India-Rubber Glove Co. It may be

added that there are some others in New York who are very wealthy, but it is not known whether they cross the million-dollar line. In Boston there are several, among whom are Elisha S. Converse and R. D. Evans, and in New Jersey there is the Meyer Estate. Then there is G. A. Lewis, president of the Wales-Goodyear and some people in the trade in Ohio who have an abundance of this world's goods. Joseph Banigan, a giant in the trade, is supposed to be over the mark, and Henry L. Hotchkiss of the L. Candee Rubber Co. is rated that way. M. C. Martin, executor of the estate of the late Christopher Meyer, has an abundance of wealth, say \$3,000,000, controlling many millions. The late Eugene H. Clapp died worth a million; in short rubber has been very good to a class of intelligent, bold men who have handled a substance about which comparatively little is known except as it has come down from man to man in the factory.

The Death of Robert Soltau.

THE rubber trade last month was shocked to learn of the sad death of Robert Soltau, a well-known importer in New York. Mr. Soltau was very fond of boating, and having lately bought a naphtha launch, he spent a large portion of his leisure time in steaming off Long Island, near East Rockaway. He was a man possessed of a large confidence in himself, although very quiet in its demonstration, and it is believed that he gravitated into unusual risks, although the exact circumstances of his death by drowning will never be learned. He sailed on the launch on July 19, in company with his brother Ernest, who was on a pleasure trip to this country, and never returned. The launch was subsequently found, and then it was hoped that the two brothers had been picked up by some passing vessel, and that, in the course of a few days, tidings would be received from them. This hope proved to be a delusion, for nine days afterwards the two bodies washed ashore in an inlet not far from their starting point.

Mr. Soltau was born in Hamburg, Germany, thirty-nine years ago, and came to this country in 1881 to look after the interests of his father in the rubber business. He gradually became a large importer for himself, and as he had a masterly knowledge of the business in the two countries, he became very successful. He was an authority on Gutta-percha, having devoted many years of attention to it. He was very well known to all in the trade, and his death is a peculiar misfortune to it. Outside of the rubber business he was active in many ways, his talents being numerous as well as versatile. He spoke fluently English, French, German, Spanish, and had a knowledge of other Continental tongues; in fact, he was a linguist of high order. His tastes leaned to music, and he was an exquisite performer on the violin. He was a member of the Manhattan Club, and of the Liederkrantz (musical) Society. Socially, and in business, he was attractive by reason of his fine mentality, and friends made were retained by his steadfastness and commercial integrity. He leaves a widow and three children. His parents, who reside in Germany, have been called here by the sad intelligence.

TRADE AND PERSONAL NOTES.

THE Columbus (Ohio) Rubber and Belting Co. advise THE INDIA RUBBER WORLD that they are now nicely settled in their new quarters, No. 121 South High street, which they have been induced to take on account of the need of more space for their increasing business. Their floor space consists of two very elegant rooms, each 22 x 188 feet. The rooms are very light and airy; provided with electric light and natural gas. In addition to their mill-supply trade, it is their intention to greatly increase their rubber-goods stock, paying special attention to Ladies' and Gentlemen's fine mackintosh goods, both wholesale and retail, as well as all the other lines of sheeting and rubber surface clothing.

—It is reported that some of the hands lately employed at the Brookhaven rubber factory, Setauket, L. I., have gone elsewhere to find work, due to the closing of the factory caused by broken gearing.

—The Calumet Rubber Co. of Chicago have filed a certificate of increase of capital stock from \$12,000 to \$20,000.

—A late report is that after a silence of eighteen months the old plant of the Woonsocket Rubber Company on South Main street will be started up at once. Preparations are now on foot and work will commence within a month. The mill will manufacture all kinds of rubber shoes, and will be run as an annex to the Alice mill.

—The Newport (R. I.) Elastic Fabric Co. have added two more looms to the number already in use at their factory on Marlborough street.

—The receipt is mentioned, at the Jqnesboro (Ind.) rubber works, of an order for 145,000 feet of various sized wires.

—James Ruddick, manufacturer of rubber shoes at Fall River, Mass., says the *Boston Journal*, will settle through insolvency.

—Mr. Francis, former superintendent of the Hartford Rubber Works, has been elected president of the same company.

—Mr. Hudson Dickerman has accepted a position as traveling salesman for the Commonwealth Rubber Co., New York. Mr. Dickerman has many friends in the trade, and both he and the Commonwealth will undoubtedly enjoy their new relations.

—The National India Rubber Co. report the largest tennis-goods season that they have yet had, and their output will undoubtedly be found to be the largest in the United States this year. They have also added ladies' garments to their mackintosh department, the goods being marked "National India Rubber Co." and "Goodyear Rubber Co."

—The Mercer Rubber Co., of Trenton, N. J., were recently obliged to shut down on account of the extreme heat.

—The Lockwood Manufacturing Co., of East Boston, are running night and day without being able to fill their orders.

—D. M. Baldwin, successor to the late John W. Gray, has recently moved to a new store, No. 331 Main street, Hartford, Conn. He has one of the finest locations on the street, the store fronting on State street. It is stocked with carefully-selected goods in all lines of rubber manufacture. The general goods are for the retail trade but he carries also hose, packings, and belting for the jobbing trade. Mr. Baldwin has been a rubber-man for many years and understands the wants of his trade thoroughly, and is doing a constantly increasing business.

—The New York Belting and Packing Co. are building a new factory in Passaic, N. J., 200 by 50 feet, to be devoted exclusively to the manufacture of bicycle-tires. Their business this year in this line is reported to have amounted to \$300,000.

—The employes of the New York Belting and Packing Co. in the factory at Newtown, Conn., began the month with a strike to emphasize their objection to the new check system introduced as a substitute for the keeping of a time-book by the foreman. After a day and a half, during which time General Manager Jones paid a visit to the factory, the men consented to go back to work, with a view to giving the new system a three-weeks' trial.

—The United States Rubber Co. are now rapidly completing the work of appraisement and a report is expected during the present month. After that the issue of stock to take the place of that in escrow will be in order. The appraisal has been tedious work, for upon its accuracy depends the fairness of the exchange of stock. All of the mills in the company are in full-tide of operation, the summer respite having been very short.

—There is no rubber store at Vancouver, British Columbia, and the people of that city are clamoring for one. Numerous rubber articles can only be obtained by sending across the continent to Toronto or Montreal. A traveler who has been there lately says that \$5000 capital would be required, and that very handsome profits could be secured. It is apparent, however, that the trade in other lines are not aware that they could take it on in sections, as is done "back East" to a large extent. In other words the hardware-man could keep hose, belting, packing, etc.; the druggist, syringes and water-jars; the tailor, mackintoshes, and so on. Doubtless the needs of the people could be satisfied better than they are now in such a manner. Rubber articles are so necessary that it is a pity that any part of our civilization should want for them.

—In the July number of THE INDIA RUBBER WORLD, the types stated that rubber dam weighed three pounds to the yard. Rubber dam was libeled in the statement, the fact being that it takes three yards to make a pound of this cobweb material, in which is displayed so much skill.

—Progressive manufacturers in the rubber trade are giving considerable attention to safety-boilers. Higher steam-pressure than heretofore used is found to be a source of economy, particularly in the vulcanizing processes. The National Water Tube Boiler Co., of New Brunswick, N. J., have recently furnished the Peerless Rubber Manufacturing Co., of New Durham, N. J., with a boiler of 105 horse-power nominal capacity. As the "National" boiler has a large margin above the company's rating, this boiler will largely exceed the duty named, with good economy. While the "National" boiler is adapted for general use and is sold largely in almost every State of the Union, parties in the rubber interest may find it profitable to look into the special adaptation of this boiler for rubber-mills.

—The Williams Rubber Co. report a large continued demand for bathing caps. Next month they will put a new hat cover on the market.

—Frank J. Gaffney has been appointed selling-agent of the Woonsocket Rubber Co. in New York, Mr. Eldridge having retired on account of ill health.

—A patent has recently been issued to Nashville, Tenn. parties for a device which imbeds a conducting wire in fire-hose and thus places the pipeman in continuous communication with the engine.

—A newspaper report from New Bedford, Mass., says: "There is talk of a new rubber factory here, though the authenticity of the movement is doubted by many, and it is hard to get particulars as yet."

—The National India Rubber Co. have appointed the Enterprise Electric Co., Chicago, their general Western agents for the sale of insulated wire.

—The sale of fire-hose has been larger this year than ever before in any one season. Cities and towns are growing, new villages are springing up, and insurance men are constantly prodding tax-payers in the indirect way of favorable rates under imposed conditions to have excellent fire service, and this is having its effect in an increased demand. Flats and hotels are satisfied with linen hose, but public buildings use only the best of duck and rubber. Hose racks are now gotten up with a good deal of artistic design and nice white linen hose makes a good display at a fraction of the cost of rubber, but naturally the latter is the more durable and reliable.

—H. O. Canfield, of Bridgeport, Conn., on his last trip to Philadelphia was very successful in obtaining large contracts for mold-work.

—The Gutta Percha and Rubber Manufacturing Co., report a fine business in fire-hose this season, their carbolized hose, which weighs only 45 pounds to the fifty-foot length and has a pressure of 400 pounds, making as usual a good leader. Carbolized hose will not rot or mildew and obviates the necessity of a tower in the engine house and a double quantity, the hose never needing to leave the reel save at the scene of the fire. It has also been a great year for mats with this company, their varieties being so large as to give a purchaser a desirable selection at once.

—The compulsory use of air-brakes on railway trains by some of the State legislatures has caused the large roads to send experimental trains over their tracks in order to familiarize the employes with the routine of their use. The Louisville & Nashville Railroad Co. lately sent a train through to New Orleans equipped in this manner, and for this purpose. The use of these air-brakes will in a short time become almost universal, and the business of rubber companies in this direction will continue to increase for some time to come.

—The Millard Manufacturing Co., of Providence, R. I., have taken more commodious quarters in the building in which their works are located and have also fitted up fine offices.

—Mr. T. C. Lothrop, proprietor of the Boston Car Spring Co., announces his intention of selling off the machinery that is now lying idle at the mill at Roxbury, Mass.

—The Royal Fossil Flour Co. have orders for their material that it will be difficult for them to fill for some time to come. They have lately acquired several new and valuable deposits of this same material in Canada.

—Regarding the recent article in THE INDIA RUBBER WORLD on "How Railroads Buy Rubber," a mechanical-goods manufacturer said: "No doubt that is the way railroads ought to buy rubber, but as a matter of fact favoritism and nepotism enter more largely into that business than any other I know, and unless a man has some sort of a 'pull' he is not likely to sell many goods."

—The rubber business of the E. H. Clapp Estate is increasing so rapidly that they have been obliged to enlarge their mill at Hanover, Mass., and have also added a new engine, boiler and feed-water heater.

—Mr. G. F. Gilmore has opened a new rubber store at Newport, R. I. Mr. Gilmore was formerly in the trunk business. He will now handle a full line of druggists' sundries.

—The Elastic Tip Co., of Boston, Mass., are having a large run on bicycle tires.

—The only rubber goods on the free-list going into Mexico is insulated wire, and that only when the diameter of the wire itself is less than No. 6 Birmingham gage.

—Mr. Julie Betancourt, Minister of Colombia in Spain, has lately compiled a list of goods such as would be marketable in his country. Among them he gives India-rubber and Gutta-percha goods a prominent place.

—The question of ventilation in rubber factories seems to be very satisfactorily solved by the Sturtevant Blower Co., who have recently equipped some of the large factories with their ventilating apparatus.

—Mr. Arthur Clapp, who is now the active manager of the enormous business interests of the late E. H. Clapp, much resembles in energy and executive ability what the latter was at his best. He is perhaps as well known to the rubber manufacturers as any man in the country as he formerly had charge of the sales of the recovered rubber manufactured by them.

—Mr. M. L. Derrick, a well-known rubber-clothing man, has gone into the brokerage business in Boston, the firm being Derrick & Hutchinson, No. 75 Devonshire street.

—The Wellman Sole-Cutting Machine Co., of Pearl street, Boston, passed through fire recently. The best of their patterns were saved however, and their work was not very much delayed.

—The new superintendent of the cable department at John A. Roebling's works at Trenton, is Mr. Newbury, who was formerly a chemist there, and is well informed on rubber and kindred matters.

—Mr. H. F. Taintor, the well-known Whiting manufacturer, imports his raw material from *old* England, and not from New England, as the types made the item read in the last number of THE INDIA RUBBER WORLD.

—The Meyer Rubber Co., of New Brunswick, N. J., have just purchased one of the Wellman sole-cutting machines.

—The failure of the Lester Shoe Co., of Binghamton, N. Y., which occurred last month, may be said to have been an eye-opener. One rubber company was caught for \$50,000, another for \$40,000, and others for \$60,000 and \$15,000 respectively. The latter, it is understood, replenished its goods, otherwise the losses were well nigh total; and the surprise is that the commercial agencies rated them at from \$300,000 to \$500,000. The Lester-shire Manufacturing Co. are confused with the concern, and are rated at \$1,000,000, but in what respect at the present time it is difficult to say. Reade street, Boston and other localities feel pretty sore, and are pushing their claims through a firm of New York lawyers.

—Mexico is constantly decreasing its exports of rubber, the first six months of this year showing a decline of 33½ per cent. An attempt is being made to revivify the industry in Chiapas, a State bordering on Guatemala.

—The New York Insulated-Wire Co. have an order for 15,000,000 feet of Grimshaw white-core wire to feed the 92,000 incandescent and arc lamps and motors to be used in the World's Fair buildings and grounds.

—A Hamburg merchant during the past month offered to New York importers 165,000 pounds of raw Gutta-percha, part "first" and part "ordinary." This Gutta-percha was, however, more or less damaged by fire while in the quay warehouse in Hamburg.

—The Newton Rubber Co. are having a good demand for rubber storage-batteries. The company in this new speciality have studied the subject so carefully that they have become recognized as an authority on the subject.

—The Rubber Reclaiming Co.'s factory at Birmingham has been so busy of late as to make it necessary to run all night. They have received notice from the water company, however, that on account of the water being so low they cannot be supplied with power at night, and the extra force of workers has been laid off.

—Beck Brothers, of Springfield, Mass., report business as good. They have recently put another traveling man on the road, and he is meeting with good success.

—Col. A. S. Taft, of the Worcester Rubber Co., was in New York during the hot spell.

—Henry M. Clark, of the Globe Rubber Works of Boston, has been on an extended trip in Maine and New Hampshire. He reports sales as good and the future outlook brilliant.

—A new concern is the Boston Coupling Co., manufacturers of fire department supplies, No. 1 Hartford street, Boston. W. Clifford Sargeant, the manager, has been for the past twelve years with A. J. Morse & Son, of Boston. They manufacture all styles of pipes, couplings, etc., and couple all kinds of hose—steam, water or suction.

—F. Phelan, of F. Kaldenberg & Co., is on a trip in New England.

—The Commonwealth Rubber Co., of No. 42 Vesey street, New York, have devoted part of their new store to the display of a fine line of mackintosh garments and rubber clothing. As they advertise as *manufacturers* this rather surprised our reporter, who, until he learned that by a single aggressive business-like stroke they had secured a fully-equipped clothing plant, machinery, help and management. It is but simple justice to say that the plant is splendidly furnished, and with the force of traveling men that the Commonwealth employs, there is no doubt that a large business will be done. Mr. Randolph, the President of the company, is wide awake to have the best goods and the most stylish that can be made, and he is pushing this part of the business with his characteristic energy.

—A large order for Bailey's bath and flesh brush has just been received from the United States Government, the brushes to be used in the army.

—Joseph Bessler and Wesley Wilson, under the firm name of Bessler & Wilson have started in business for themselves at Akron, Ohio, and will manufacture a general line of hard-rubber turned goods. The young men were formerly both mechanics at the Hard-Rubber Works and have now started out for themselves. They are in a part of the buildings occupied by the Akron Brass Works. They manufacture rubber pens, pencils, etc.

—There are 150 sewing-machines at work in the factory of Apsley Rubber Co., at Hudson, Mass. About fifty girls have been added lately to the already large force.

—The annual shut-down of the Boston Rubber Shoe Co.'s factories began on July 28th, to last ten days. This time will be devoted to making repairs and giving the 3500 employes a vacation.

—A representative of the United States Rubber Co. has been up to Framingham, Mass., to discuss with the town assessors the valuation placed upon the plant of the Pará Rubber Shoe Co., which is regarded by the rubber people as too high. "They claim," says the South Framingham *Advocate*, "that it will cost \$50,000 to put the plant in proper condition to start, which they intend to do in the near future. Their intention is to close one of the other factories now controlled by them, but which has not the favorable advantages or facilities in regard to location possessed by the Pará plant." The company's representative stated that, although the company were favorably impressed with South Framingham as a business location, it would not do to impose a too heavy burden in the matter of taxation, as other towns were ready to put up buildings, and it would be an easy matter to move the machinery and plant. The valuation referred to is \$188,000.

—The Morse-Coe Shoe Co., of Omaha, claim to have in their new store the finest rubber department in the West.

—Charles F. Simon, foreman of the Pará room of the National India-Rubber Co., has started for Germany to visit friends and on business, to be gone two or three months. Mr. Simon has a new invention in woven-hose rubber lined, on which he has patents in the United States, England, France, Germany, Austria, Italy and Belgium. He has recently received a medal, diploma and card of membership from the Academie Parisienne des Inventeurs Industriels et Exposants of Paris.

—The New Jersey Car Spring and Rubber Co. have issued a card of good proportions illustrating the various descriptions of rubber mats made by the company. On the reverse side of the card are complete price-lists. The card is intended to be hung up in the office or store, and will be mailed to dealers asking for them.

—The Stephen Ballard Rubber Co. are disposing of good quantities of their red garden-hose.

—During the recent heated term it was found impossible to work in many of the rubber factories. In New Brunswick, N. J., 500 people found themselves idle one day, the heat being positively unbearable to any one but a salamander.

—A new style of rubber mat placed upon the market is well-nigh indestructible, and is called so by some. It is composed of a series of projecting cone-shaped points. The best of pure gum stock is placed in these points, and in consequence, they are so flexible as to clean automatically the sides of the boot as it passes over the surface. In offices it has proved very desirable for persons who are compelled to stand at their work, such as book-keepers, as it is as soft as an air-cushion under foot. Perhaps a good description of it is to liken it to the coin-mat on an enlarged scale. It costs about twice as much as the ordinary mat.

—Dentists and barbers are now using a great many rubber mats. The more advanced our civilization the greater the desire to avoid noise, and these mats placed around operating chairs are found to be peculiarly adapted to the end desired.

—The Brown-Desnoyers Shoe Co., of St. Louis, who handle a very large number of rubber boots and shoes for Eastern companies, have a staff of thirty-five traveling salesmen.

—Rubber pump-valves are readily refaced equal to new, by holding them on the grindstone, all indentions being thus removed.

—H. D. Cheever, president of the Okonite company, has gone to Europe, on a combined business and pleasure trip. Naturally he will look over the branch factories of the company abroad.

—The combination of India-rubber with asbestos in the manufacture of goods of various kinds is an industry that is assuming great proportions and obtaining a prominence quite in contrast with the quietude which has marked its ascendancy into the business world. For a packing which has to resist great heat and moisture, and at the same time be highly elastic, a woven sheeting is made of asbestos cloth, coated upon both sides with India-rubber and vulcanized. The same principle is applied to tape used in steam and water joints. Block asbestos packing is built up with a number of layers of asbestos, with a rubber back, the mineral insuring the life of the gum, and the latter giving elasticity. Asbestos in addition to its well-known qualities as a salamander possesses those of a lubricator to a certain extent.

TRADE PUBLICATIONS.

THE Boston Woven Hose and Rubber Co. have just issued a price-list and discount sheet for 1892, that is totally different from anything that has yet been published in the way of a rubber catalogue. So novel is it that the company have copyrighted it and propose to revise it every year. It covers rubber goods and rubber supplies, and it is issued primarily for their

salesmen and agents. On the fly-leaf the introductory sentence says: "This is a business catalogue, compiled by a business house for the use of business men." In looking through the pages following one is struck with its business-like appearance, and the compactness and the availability of the information that is contained therein. Everything is alphabetically arranged, beginning with "Anti-Rattlers," under A., and ending with marlin, round, flat, and steel winding under W. Between these two extremes will be found everything in the way of hose, belting, packing, and all supplies, so catalogued that one can turn to anything in these lines and in a few seconds learn all about styles and prices, with current discounts.

RUBBER-MEN ON VACATION.

MR. JOHN H. FLINT, treasurer of the Tyer Rubber Co., is spending the summer at Nantucket, Mass.

—John Heard, Jr., formerly general manager of the Brunswick Antimony Co., is on his way to Europe for a two years' stay, which his state of health imperatively demands.

—Mr. Frank T. Williams, of the Tyer Rubber Co., is at Newport, R. I., with his sister.

—Mr. Charles T. Wood, No. 67 Chauncy street, Boston, is in Maine on a two weeks' vacation.

—Mr. E. H. Paine, treasurer of the American Rubber Co., is at York Beach, Maine, on a two weeks' vacation.

—Major E. C. Pierce, of the Pierce Rubber Mills, is spending the summer at South Weymouth, Mass.

—Mr. J. O. Stokes, treasurer and general-manager of the Home Rubber Co., Trenton, N. J., is at his summer place at Belmar, a beautiful watering-place on the Jersey coast.

—Vice-President Balderston, of the National India Rubber Co., has a residence at Swampscott, Mass., during the summer.

—H. S. Randall, of the Boston Rubber Shoe Co., is on a vacation in the Adirondacks.

—George H. Quincy, of the L. Candee Rubber Co., has returned from his vacation at Poland Springs, Me.

INDIVIDUAL MENTION.

MR. RALPH W. MORRELL, formerly New York agent for the Standard Rubber Co., has been elected secretary of the Investment Trust Company of America, and has his office in Boston, Mass.

—It is a matter of gossip that Mr. F. A. Magowan, of the Trenton Rubber Works, made half a million dollars recently in the Sanitary Pottery consolidation.

—The friends of William Morse, of the American Rubber Co., will regret to learn of the death of his infant daughter, which occurred on August 8.

—George M. Conant, of the Conant Rubber Co., is a baseball enthusiast. On pleasant days, when business will permit, one will generally find him at the grounds "rooting" for the Bostons. Ben. Porter, of the "Boston Gossamer," is another, and the expression on his face when "our boys" lose would not endear him to a new customer.

—A. Montgomery, of the American Steam Packing Co., is with the Boston Commandery, Knights Templar, at Denver. During his absence his partner, Walter J. Staples, is hustling, as besides the principal partner, both the bookkeeper and shipper are on vacation.

—John A. Pingree, a salesman well known in the hardware and rubber trade, formerly with the Boston Car Spring Co., died suddenly at the Astor House in New York on July 28. The funeral services, largely attended by the hardware and rubber trade, were held at his late residence in Dorchester, Mass., on August 1, when the Masonic burial service was read.

Tests For Quality in Carriage Cloth.

"BIG buyers of carriage cloth have a variety of tests that they spring upon us from time to time," remarked a salesman recently. "Some of them are sensible and worth remembering, others are of no earthly good. As a matter of course I fall in with every man's fad and let him prove what he wishes, provided he does not come down too heavily on my goods. At the same time there are some tests that are generally used that are valuable. To begin, all smell of the cloth. Usually they get a whiff of varnish and know no more than at first. Occasionally they distinguish the coal-tar odor that always accompanies the use of shoddy, but they don't know whether the smell proves that the goods are better or worse than they should be. The next step is to cut a sample of the cloth diagonally and stretch it. This tells at once whether the stock is heavily loaded or not, but does not give any idea of its wearing qualities. I have seen drill that went all to pieces under this test, and yet in actual service that would wear like iron.

"Then, again, many rub two gum surfaces together and listen to the 'squeak.' The more rubber there is in the compound the more friction is developed and the more decided the squeak. Another plan is to fold the cloth upon itself and rub vigorously in one small spot. This quickly wears a hole through the thin coating of rubber, leaving the drill exposed. Now if the rubber starts off in little flakes it is pronounced good. If, however, it tears, they claim that it will not last when in use. Often a customer will hand out a sample from some rival manufacturer, and request that you rub yours and his together to see which will last the longer. When a man asks me to do this I know I have got him, and for this reason:

"The natural way to rub one piece of rubber-cloth with another is to put one piece flat on a table and rub hard with the other. Now I place *his* on the table and taking mine proceed to rub vigorously. Very shortly I have worn a hole through his and mine is practically uninjured. Yes, 'there are tricks in all trades but ours.' The most unsatisfactory customer of all is the man who wants samples to tack on the outside of his office building, where wind, sun and rain will test it for several years. He loses track of it, his partner tears it down, or something happens that makes the test a failure."

Nicaragua's Failing Rubber Trade.

THE decline in the rubber trade of Central America is referred to in a letter from F. N. Jose, Bluefields, Nicaragua, to the *American Agriculturist*. He says that the supply of the Bluefields river has already been practically exhausted, and other streams, like Great river, are now being worked out. With forestry regulations, Mr. Jose says, this industry, for conducting which the Indians of the Mosquito reservation are admirably fitted, could be steadily developed; but as they are ignorant, and not under intelligent control, they are now gradually exhausting the rubber veins in the dense tropical woods.

REVIEW OF THE RUBBER MARKET.

THE crude rubber market, notwithstanding its strong statistical position has declined to what is generally considered low figures at any time. No substantial reason can be given for this, save the matter-of-fact assertion that holders are willing to sell "futures" at the quotations, and do not care to hold for speculative purposes. Importers are in line with Pará and Manáos people having very close connections with that country, and they would naturally be the first to learn of anticipated large deliveries at those two points on the Amazon. The "bears" claim that business in manufactured goods will soon turn for the worse, and we shall be on a down grade, and one of the largest manufacturers in the United States is said to have been authority for this opinion expressed within a week.

Students of markets in the rubber trade—and it has its share of them—in casting about for the cause of decline in actual face of the laws of supply and demand, claim that a change in the purchasing power of the dollar is going on, on account of the unprecedented decline in silver. India is in financial distress on this account and they say that such an international trade as that in rubber cannot help being affected. Such changes in values work slowly and silently like the flow of the tide. The first that the "bull" is aware of he is high and dry on the sand, beyond practical aid. There are some silver countries shipping us rubber, but the theory is that all values more or less are undergoing a change.

One thing is certain, and beyond theory—rubber is low. Stocks are also low, and manufacturers are buying freely with very large transactions. The low prices have evidently tempted the manufacturers to add to their stocks. This practical policy they invariably pursue; when rubber reaches the prices now prevailing they come into the market irrespective of any idea that quotations might go lower. Centrals have been in good demand.

The visible supply of the world August 1, compared with the same time one year ago is as follows:

	August 1, 1891.	August 1, 1892.
United States.....	1,228 tons.	504 tons.
Europe.....	1,571 tons.	650 tons.
Pará.....	645 tons.	495 tons.
Afloat.....	573 tons.	265 tons.
Total.....	4,017 tons.	1,914 tons.

Compared with one month ago there has been an increase in stocks of 258 tons—25 tons in the United States, 285 tons at Pará, 115 tons afloat, and a decrease in Europe of 132 tons. This increase probably accounts for some of the decline in rubber, but stocks are rather low to allow of the full fluctuation. Last year there was a decline of 120 tons during the month of July, but the comparison is of small moment on account of the abnormal condition of the statistical position then.

The receipts of Pará rubber during the month have been as follows, in pounds:

	Fine.	Medium.	Coarse.	Caucho.	Total.
July 20—By Basil.....	50,400	6,100	38,500	1,800	96,800
July 27—By Gregory.....	155,300	18,200	93,600	23,000	290,100
Aug. 1—By Segurança.....	163,900	21,400	76,200	43,300	304,800
Aug. 4—By Paraense.....	4,600	1,100	36,600	369,600	411,900
Total.....	374,200	46,800	244,900	437,700	1,103,600

The principal importers since the first have been for the New York Commercial Co., Lawrence, Johnson & Co., Boston Rubber Shoe Co. and Reimer & Meyers.

Deliveries during the month of July to manufacturers were 295 tons in the United States, and 260 tons in Europe.

The statistical position of Pará rubber in New York is thus reported for July, 1892, as compared with the same month in preceding years:

Stock of Pará here	June 30, 1892,	about	1,000,000 pounds.
Receipts	July	"	962,000 pounds.
Deliveries	July	"	862,000 pounds.
Stock	July 31, 1892.	"	1,100,000 pounds.
Stock	July 31, 1891.	"	2,670,000 pounds.
Stock	July 31, 1890.	"	600,000 pounds.

Prices for July.

	1892.		1891.		1890.	
	Fine.	Coarse.	Fine.	Coarse.	Fine.	Coarse.
First.....	68	46	81	51	91	68
Highest...	68	46	81	52	92	68
Lowest....	67	43	77	47	91	66½
Last.....	67	43	79	50	91	66½

The imports of crude rubber in detail from Central America and South America since the first of the month have been as follows:

August 3.—Steamer *Morua* from Nicaragua and Honduras.

	Pounds.
Eggers & Heinken (2 casks, 1 case, 1 bale Belize).....	800
J. Agostini (4 bales Truxillo).....	400
A. P. Stout (76 bales Greytown).....	7,500
Munoz & Esprella (25 bales Greytown).....	2,500
Fabien & Mendez (2 bales Greytown).....	300

Total..... 11,500

August 3.—Steamer *Mexico* from Vera Cruz.

	Pounds.
Thebaud Brothers (2 bales).....	400
Camacho, Roldan & Van Sickle (1 bale).....	200

Total..... 600

August 3.—Steamer *Paraense*, from Pará.

	Pounds.
London and Brazilian Bank from La Rocque da Costa & Co.,... 18,263	
Brown Brothers & Co., from La Rocque da Costa & Co.,... 16,368	
To order (Fusinelli Prüssé & Co.)..... 40,436	

Total..... 75,067

August 8.—Steamer *Alvo*, from Cartagena and Savanilla.

	Pounds.
Hoadley & Co. (4 bales).....	800
H. W. Peabody (4 bales).....	800
Pim Forwood & Co. (15 bales).....	3,000
W. R. Grace & Co. (82 bales).....	17,000
To order (14 bales).....	2,800

Total..... 24,400

August 9.—Steamer *Orisaba*, from Mexico.

	Pounds.
Theodore Herman (2 bales).....	300
H. Marquand & Co. (3 bales).....	600

Total..... 900

August 9.—Steamer *Nicaragua*, from Bluefields.

	Pounds.
W. R. Grace & Co. (14 bales Tunos).....	2,800
W. H. Crossman & Brother (54 bales).....	10,800
Earle Brothers (102 bales).....	20,400

Total..... 34,000

The receipts of Centrals during July were 140,000 pounds, which are very light. Stocks are estimated at 75,000 pounds.

The bear houses claim that there is a concealment of stocks in New York, and that they are twice as large as are given.

Late cables from Pará quote Islands at 4800 reis, and Up-river at 5000, with Exchange at 10½d. Prices there are nominal. A large house is doing a good business in Centrals, laying

them down at 20 cents less than fine Pará. They scour the coast down to the Peruvian line.

The bears say that the visible supply, when analyzed, showed last year 1000 tons larger than the year before, and that comparisons are misleading. The receipts this year will be large, 500,000 kilograms being expected at Pará this month. They say when they buy rubber in South America, they immediately sell it short in New York in the shape of "futures," being satisfied with fair commissions.

The latest New York quotations are:

Pará, fine, new.....	63-64	Sierra Leone.....	24-40
Pará, fine, old.....	68-70	Beniguela.....	44-45
Pará, coarse, new.....	41-46	Congo Ball.....	36-42
Pará, coarse, old.....	45-49	Small Ball.....	33-36
Caucho (Peruvian) strip.....	44-45	Flake, Lump and Ord.....	21-23
Caucho (Peruvian) ball.....	50-51	Mozambique, red ball.....	
Mangabeira, sheet.....	36-38	Mozambique, white ball.....	
Esmeralda, sausage.....	50-51	Madagascar, pinky.....	55-56
Guayaquil, strip.....	37-40	Madagascar, black.....	40-42
Nicaragua, scrap.....	47-48	Borneo.....	28-43
Nicaragua, sheet.....	45-46	Gutta-percha, fine grade.....	175
Guatemala, sheet.....	38-43	Gutta-percha, medium.....	115
Thimbles.....	38	Gutta-percha, hard white.....	115
Tongues.....	33-36	Gutta-percha, lower sorts.....	nominal

In regard to the financial situation Messrs. Simpson & Beers, brokers in crude India-rubber and commercial paper, New York, advise us as follows:

"In July, there was only a moderate amount of prime rubber paper obtainable, and it was readily taken at $4\frac{1}{2}$ @ 5 per cent. until toward the end of the month, when rates rose $\frac{1}{2}$ @ 1 per cent. for six months' paper, and our banks mostly withheld buying unless they got their own rates. We predict a steady demand during August for the best paper at 5 @ 6 per cent. Although some \$4,000,000 of gold was exported on July 30, now that the Anti-Option bill has been shelved in Congress until next December, we think sufficient grain and cotton bills will be made to prevent further export of the precious metal."

RUBBER-GOODS TRADE.

If all reports are to be believed, the past month has not been a good one for business. It has been excessively warm, the Homestead strike has been on, gold has gone out of the country in an aggravating sort of way; the silver question will not seem to down, the corn crop has "failed" for the third time this season. As a matter of fact, business in the way of distribution of goods does not pay much attention to the trifles that bother statesmen and keep bankers awake nights or disturbs the farmer who is disappointed because he cannot beat the Reading "deal" with cheap fuel in the way of corn. The people seem to have plenty of money and are buying all they need and much that they think they ought to have.

Boot- and shoe-men report an excellent business. All the mills are busy and fully employed on "details." The demand seems to be urgent from the retailer, who is said to be bare of stock. The United States Rubber Co. have, to a considerable extent, interposed in curtailing the competition in "thirds," really the most unprofitable of all lines, and the most unsatisfactory in point of wear. A customer may grumble about high prices, but let him find out that he gets good wear, and he will forget all about cost. But let him get poor goods and it is rank poverty which tempts him to renew the experience at any price. The largest concerns in the country do not make "thirds," and they seem to get further away from the alms-house every year.

In tennis goods the season is about over. The season has been a good one, but rather perplexing in the matter of following the public taste. Light-colored goods of the better qualities have been the best sellers and stocks of this sort are now bare. Next year it may be something else, with a chance of every one overdoing the business.

In mechanical goods, garden-hose is the discouraging feature. The weather is just right now, but it came too late for a full season, and therefore it is disappointing. In rollers, paper-mills are doing better than ever before. Belting, packing and gaskets are going off in great shape throughout New York State. There has not been a time within the past ten years when manufacturers felt more confident of prosperous times ahead than they do at present, consequently they are running their factories as they never were run before, and naturally need packing, belting, etc., all the time. In the West this demand is not so marked. In hose the business holds good, and fire departments are replenishing and adding to their stocks everywhere. Lithographer's blankets, a steady trade, keeps its own all the time. The jar-ring business is about over and sales are scattering.

In druggists' sundries it is the dull season, but dealers say it is better than last year. Stock is now being made for the fall trade. Department stores are selling these goods now-a-days, at prices bordering on the ridiculous. One remembers the "thirds" in rubber shoes which were sold last winter at 18 cents, warranted waterproof in dry weather, and it is presumed that these goods are to be used by persons robed in oil-cloth and mackintoshes. On the other hand department stores sometimes sell goods at a loss as an advertisement, and this may be a case in point.

Dress-shields are going off as usual, and the whole line of seasonable specialties is doing well.

It is the dull season for hard-rubber goods. Insulated-wire men are doing better than ever.

In clothing there has been a lull during the past week or two owing to the hot weather. Some buyers are in town, but doing little. A hardware dealer will buy skates on his way down to Coney Island to escape a sun bath, but the rubber-man at the first signs of drought will draw into his shell and roll by on the other side of the mackintosh manufacturer.

In manufacturers' supplies Litharge is quiet, with foreign sorts irregular. Oxide of zinc is in full supply with steady prices; foreign unchanged. Linseed-oil is lower. Turpentine slow, and probably $\frac{1}{2}$ cent lower. Sulphur firm at \$24.50 for unmixed seconds; and \$23.50 for unmixed thirds.

In the color trade the consolidation of the firms of C. T. Reynolds & Co. and F. W. Devoe & Co. is noted, the style of the new company being the F. W. Devoe & C. T. Reynolds Co. The new company will be conducted from the commodious offices of the F. W. Devoe & Co., corner of William and Fulton streets, New York.

It has lately been found that the smoothness of surface in the interior of rubber-lined hose is of importance. The friction of water is greater with some kinds of rubber, as it is also with a roughly manufactured inner surface. The subject has been considered of such importance that manufacturers who have not paid much attention to the subject before are modifying their methods to obviate the objections, especially as they relate to fire-hose.

A NEW substitute for insulation has been found in the way of a cotton fiber amalgamated with a compound yet a secret. It has been thoroughly tested by lengthened immersion, after which it is placed in acidulated water and its lasting qualities strained to the point of dissolution. In resistance it is said to be about two megohms better under the same conditions than caoutchouc. A company has been formed, a mill with all the machinery and necessary plant secured, and the placing of the new insulator on the market is reported to be a matter of only a short time.

A Practical Talk by a Manufacturer.

At the Massachusetts Institute of Technology recently, Mr. Henry R. Towne of the Yale & Towne Lock Co. gave an address on "Shop Management." Mr. Towne spoke as a manager of work and a manufacturer of twenty-five years' experience.

"A man," he said, "who graduates from a technical school will sooner or later identify himself with some organized industry. The functions of executive officers are widely varied, some fundamental conditions, such as the planning of the plant, the designing of the building and the placing of the machinery, being necessary; in fact everything which may promote the efficiency and, therefore, the economy.

"The superintendent should have such intimate knowledge that he can follow the statements of the foreman and rectify any inefficiency of the department. In one plant there may be twelve or fifteen divisions; a superintendent should have a general knowledge of them all.

"The question arises, how obtain a knowledge of them all? The technical side must be obtained by observation. One should acquire the habit of observing all which takes place around him, and, if this is cultivated, it soon becomes a habit, and is the kind of knowledge which one wants, if ever called upon to manage. Finally, the use of notebooks is a convenient form of acquiring important data, figures and formulae.

"The three essentials for a young man to acquire are forethought, method and self-confidence. Of the three, self-confidence is the most important. Industries relating to special products are developing so rapidly that originality and self-confidence are very essential. One must be fertile in new resources to meet new difficulties.

"In executive work, one of the most important questions is the method of dealing with other men. A person holding an

important position is apt to deal with persons under him, not as men, but as machines. The military idea of discipline is right to a certain extent, but should not be carried too far. In organized industrial labor we want highly intelligent men, but if we have them we must treat them as such.

"The old system which grew up in the beginning of modern industry is the patriarchal, or personal-management system; the other extreme from personal management is the method of reports, which is unreliable and leads to deception. Either extreme should not be followed; a happy medium is the best basis of superintendence.

"The maintenance of discipline is necessary, and a proper utilization of the subordinates, with a harmony between the whole. A method of late is the regular conferences between the heads of departments, at which matters pertaining to the whole may be adjusted."

Victoria Should Buy a Rubber Air-Cushion.

It may not be generally known that for many years past the Queen has employed a mechanical device to assist her to rise in her carriage and bow in response to the cheers of the people. A public procession is, for her, a serious matter, as the cheering is almost continuous, and she is forced in some way to respond or lose her reputation for politeness. The device is under the seat of her carriage and consists of an arrangement of very strong springs. These are held down by some contrivance for the purpose until she wishes to rise, when she touches a key, and at once the springs are released, and flying upward, force her into a half-standing position and support her there. In this way she is relieved of the labor of rising twenty times every quarter of an hour, a task which, to a woman of her age and weight, would naturally be very arduous.—*The Road (London).*

THE CHELSEA WIRE FABRIC RUBBER CO.

THOMAS MARTIN, Pres.

WE MAKE

ALFRED W. FITZ, Treas. and Manager.

Mechanical Rubber Goods

OF THE BEST QUALITY ONLY.

WE FURNISH

RUBBER BELTING AND HOSE

EITHER WITH OR WITHOUT THE INTERWOVEN WIRE.

Our Wire Fabric Rubber Hose stands **DOUBLE** the pressure and wears longer than any other Hose made.

Our Wire Fabric Rubber Belt, has less stretch, is stronger and will outlast any Belt to-day on the market.

WE GUARANTEE ALL OF OUR GOODS.

Office and Factory:

968 TO 974 BROADWAY,
CHELSEA, MASS., U. S. A.

Mention the India Rubber World when you write.



Wire Fabric, the dark lines show the interwoven wire.

—==MERIT WINS!==—
 EXAMINE THE
BADGER STATE MACKINTOSH
 TAILOR-MADE.

Seams Sewed and Cemented. Steam Vulcanized,
 AND THE
BEST OVERCOAT IN THE WORLD
 FOR THE MONEY.

MANUFACTURED BY

CHICAGO RUBBER CLOTHING CO.
 RACINE, WIS.

Clothes Wringers. Carpet Sweepers.
Garden and Builders' Hose and Tubing.
GOODYEAR I. R. C. CO., 2197 THIRD AVENUE, NEW YORK.

Mention the India Rubber World when you write.

Write for Prices and Discounts

Free Want Department.

WANTED—Capital to aid in making a display at the Columbian Exhibition at Chicago of an Abdominal Supporter. The article has merit. Investigation solicited. Address Mrs. C. K. Farrington, 149 Broadway, Everett, Mass.

WANTED—A first class salesman to take a complete line of rubber clothing, boots and shoes, and mackintoshes on commission for eastern Pennsylvania. Also one for Virginia, North and South Carolina. Address "Energy," INDIA RUBBER WORLD Office.

WANTED—Position as foreman or to superintend the manufacture of mechanical rubber goods by a practical man of long experience. Best of references given. Address, X. Y. Z., INDIA RUBBER WORLD Office. (Apr. 30)

WANTED—Position as pattern maker and designer in rubber boot and shoe factory by a thorough mechanic and inventor. Six years experience in the rubber business. Address, E. R. M., INDIA RUBBER WORLD Office. (May)

WANTED—The following second-hand machinery: Tubing machine, 24" roll mill, washer and 2 presses about 24 x 24. Address, Machinery, INDIA RUBBER WORLD Office. (May)

WANTED—The name and address of makers of machines for cutting preserve jar rings, etc. Address, T. M. F., INDIA RUBBER WORLD Office. (May)

WANTED—A man fully competent to work on couch rolls in a large rubber factory. A good place with steady job and good wages for the right man. Address, Rubber Co., INDIA RUBBER WORLD Office. (May)

WANTED—By a practical man of 28 years experience in manufacturing waterproof garments, a situation as manager or foreman. An first-class cutter and designer of new shapes. Good references from London and Manchester. Address, J. T., INDIA RUBBER WORLD Office. (May)

WANTED—A man who is fully posted on small mould work. Apply immediately to India, care of INDIA RUBBER WORLD. (May)

WANTED—A good second-hand 3 roll cloth calender for rubber clothing, about 44 inches long and 20 inches diameter. Also, a 2 roll grinder. Apply, stating condition and price and where can be seen, to C. B., No. 24 Arlington St., So. Framingham, Mass. (June)

OPEN for engagement to superintend the manufacturing of India-rubber and Gutta-percha insulated wire for aerial, underground and submarine purposes. 30 years experience in this branch. Address, Pard, INDIA RUBBER WORLD. (June.)

WANTED—A first class calender man, thoroughly familiar with both pure gum and compounded stock on Farrel Calender. Address, "Finch," INDIA RUBBER WORLD Office. (June.)

WANTED—Position as salesman with rubber manufacturer. Can furnish A 1 references. Address, T., care of INDIA RUBBER WORLD. (June.)

SALESMAN WANTED—Address, Business, INDIA RUBBER WORLD Office. (June.)

SITUATION WANTED—As superintendent or foreman in the calender and mixing rooms, 21 years experience. Particulars given. Address, Thos. Redmond, 9 Locust St., New Haven, Conn. (June.)

SUPERINTENDENT WANTED—We desire the services of a capable manufacturer of great experience with mechanical rubber goods. Must have first-class recommendations. None need apply who are not willing to take active charge and management of factory. Address, with full particulars, the F. J. Kaldenberg Rubber Co., No. 211 to 229 East 33d St., New York. (June.)

WANTED—By a young man (aged 25) position, with a rubber goods manufacturing house, either in store or offices or on the road. Has filled positions of paymaster, manager of purchasing department, and correspondent, and has traveled with a full line, both in the east and west. Address, A. T., INDIA RUBBER WORLD.

UP THE AMAZON FROM PARÁ TO MÁNAOS.

By Dr. James M. Ayers, United States Consul.

THE report which follows was prepared under instructions from the Department of State at Washington by Consul Ayers, who traveled on a steamer of the Amazon Steam Navigation Co., touching at twenty-two ports on the way up-stream. The trip consumed seven days. On his return, making a direct trip, the time consumed was four days.

"To the casual traveler, either bank of the Amazon, no matter along which of its numerous channels or water-ways he may make his way, seems a dense mass of tangled vines, shrubbery, and spindling trees; but to him who looks closely with a glass is disclosed, through occasional breaks in this woody fringe, vistas of exceeding loveliness. As a matter of fact, the banks are low and marshy, and therefore by the tides, and, during the rainy season, by the freshets, constantly subject to overflow, and consequently uncultivable.

"The owners and occupants of the *fazendas* of this region habitually have their little homes erected at a considerable distance from the water, on the high ground, with frequently only a boat-landing at the bank. The mildness of the climate, too, does not encourage any great attention to be paid to the building of these houses. They require to be merely sheltered from the rain, and the universal hammock serves the double purpose of coolness and immunity from reptilian attacks. Many of the places we saw, however, during the voyage, gave forth indubitable evidences of comfort, luxury, and wealth, as well as of thrift and intelligent cultivation of the products of the country, and stock-farming. I cannot go into detail at all in this brief paper, but I am convinced that this fertile valley, while very sparsely peopled considering its resources, yet has for a large proportion of those who are there a population of industrious, enterprising, thrifty people, who know the value of money and are keenly alive to all the means of producing on their holdings that which can be exchanged for money, and that the populations of these lands of the Amazon valleys are not the shiftless, lazy, fish-and-farina-eating, half-civilized race they have so often been painted. This latter class, dwelling in huts right on the banks and occupying the foreground of the picture, are, by mistake, taken as indexes of the whole.

"I have seen during this voyage mile after mile of cultivated plantations of cacao, bananas, oranges, rubber, mandioca, and cane, all as well kept and clean as any American farm, and others containing immense cleared pastured fields, with here and there a clump of trees left for shade, on which grazed thousands of well-bred cattle, many being of imported stock; and I find that on this lower 1000 miles of the Amazon the raising of beef for market and of horses for draft purposes is quite an industry, capable of almost infinite extension. Sheep may be raised for mutton and pelts, but not for wool, even the best breeds losing their wool, which, within two seasons, is re-

placed by hair like that of a goat. That farming on the American plan can be made a success in these valleys has been practically demonstrated by an American, Mr. J. W. Stone, a native of Massachusetts, who owns a farm about a mile east of Itacoatiara (Serpa), on the north bank of the river, about 875 miles west of Pará. He is famous the country round for his success. He has 600 acres under cultivation, and has just purchased 2000 acres more for clearing for pasturage. He raises successfully Indian corn and tobacco of a very superior quality, and also broom-corn and sorghum, besides of course, such of the indigenous products of the soil as he cares to cultivate. He is thorough, wide-awake, well informed of all the doings of the world, and, although a resident of Brazil for thirty-seven years, is still an American citizen and boasts of it. He has, he says, the only American agricultural implements in his part of the country, though his neighbors are beginning to seek them.

"My general impression of the Amazon is, that neither the islands in this great sea, nor the interlacing channels in every direction which separate these islands and are included in the general term 'the Amazon,' nor the mainland on both the north and south coasts, have ever yet been intelligently and thoroughly explored, and that some joint international commission, who would enter upon this work and successfully accomplish it, would open up to the balance of the world a new, rich, and undeveloped field, where, with few obstacles and comparatively little labor, the millions of the future may be fed and housed; and on the bosom of this system of waters their products may be wafted from their doors to the utmost parts of the earth. I am not sure that such exploration of these waters would not result in classifying this as a narrow sea of over 1000 miles in length and from 10 to 180 miles in breadth, containing, dotted throughout its length, an archipelago of islands of from one to many thousands of acres of surface, fed by no less than thirteen great rivers, and, in fact, forming the basin for the watersheds of northern and central Brazil and also of the contiguous eastern slope of the Andes. The western half of the lands adjacent to these waters, both north and south thereof, is fairly hilly and high, rolling ground, and undoubtedly susceptible of a high degree of cultivation.

"I find Manáos to be a new old city of about 20,000 inhabitants of the usual types of Brazilian citizens, in the following order as to numbers: Caboclos (half Indians), Brazilians, negroes, Portuguese, and other Europeans. The caboclos and negroes form the lower laboring class, and the others are officials, merchants, traders and boatmen. All seem industrious and busy, and, no more than in Pará, do I find the apathy so generally accredited to dwellers under the equator, and which may be set down as a myth. The city is perched upon and around a group of hillocks, some ten or twelve in number, the apex being

from forty to sixty feet above the river bank, and on an approach from either direction presents a bright, pleasing appearance. The Rio Negro is about five miles in width here and very deep, affording good anchorage for ocean steamers, even at low water, very near the shore, and during the rainy season (from January to April inclusive), when the vertical rise is from thirty to forty feet, the *Great Eastern* might float in this roadstead freely. The city is enterprising and prosperous. It is the entrepôt and outlet for all the exports and imports of the immense valleys drained by the Madeira, Solimoens and Negro rivers and their tributaries. I have been particularly impressed with its nearness, through the navigation of the Rio Branco, to English Guiana, and am convinced that a practical short cut may be found in this direction to the Rio Essequibo, and thence to the north coast of South America at Georgetown, British Guiana, which suggestion may be worthy of consideration at the hands of our intercontinental commis-

sion. The main exporting business of Manáos is transacted by thirteen firms, of which three are English, two German, four Brazilian, and four Portuguese, though nearly, if not quite, all of them largely employ English capital. They have sailing from there direct to the United States one (English) steamer each month (to be supplemented directly by another of another line, also English) and one steamer monthly to Europe, four monthly to Rio de Janeiro, and three monthly to Pará and intermediate points, besides almost innumerable small steamers plying trade with the ports of the upper rivers. In all this business, I regret to say, I do not find one American interested with hand, brain, or capital, and not a pound of this immense exportation and importation is carried in American bottoms. I feel sure that if an American house would establish a representative here, an American goods, which are now favorably known and moderately bought, would largely supplant the English and German, now flooding this rich land."

THE CHEMISTRY OF RUBBER INGREDIENTS AND ADULTERANTS.

*By Henry J. Williams, Chemist.**

VI.—SOLVENTS FOR RUBBER—NAPHTHA.

MUCH confusion exists as to what product the term naphtha really represents in trade. It was applied originally to a variety of pungent, volatile, inflammable liquids, chiefly belonging to the class of ethers; then it was extended to oils of natural origin, such as petroleum oil or rock-oil, etc. Subsequently the light oil of coal-tar, which shows some resemblance to mineral oil, but which properly should be designated by the term benzol, was included under the name naphtha, while recently it has been extended again so as to include most of the inflammable liquids produced by the dry distillation of organic substances.

In the United States it is applied to a series of hydrocarbons obtained from petroleum and having specific gravities ranging from 0.625 (rhigolene) to 0.742, and boiling points varying with the densities from 65° to 300° F.

The following naphthas are known in commerce: (1) Boghead naphtha, obtained by distilling the Torbane hill mineral or boghead coal at as low a temperature as possible; (2) bone naphtha or Dippel's animal oil; (3) coal naphtha, obtained by the distillation of coal-tar, but which must be distinguished from benzol obtained from the same source; (4) mineral naphtha, from petroleum; (5) wood naphtha, or methyl alcohol, obtained during the dry distillation of wood.

The first two products mentioned are of no great importance, but from the third, crude coal-tar naphtha, are obtained: "Once-run naphtha" and "last runnings." "Once-run" naphtha is the starting point from which the manufacturer derives, by fractional distillation, the various grades of benzols, solvent naphtha, burning naphtha and more or less "last runnings," the last two being similar

products, but from different distillations. In addition to these, toluol and xylol are other important products.

Solvent naphtha is so called from its wide application as a solvent for India-rubber in the manufacture of waterproof articles. Its specific gravity should not exceed 0.875. Its composition is complex and includes considerable amounts of xylols and cumols, homologues of benzol, together with more or less paraffine and sometimes a small percentage of naphthaline. The latter substance is very objectionable as it acts upon the rubber much like oil and is apt to cause it to rot. The solvent power of this naphtha is largely due to the xylol present, which of late years, has frequently been removed by itself, owing to an increasing demand for xylol, with the result of leaving the residual naphtha less suitable for its intended purpose.

Coal-tar benzol, coal-tar naphtha and solvent naphtha are not now used so extensively in the manufacture of rubber goods, as they were formerly, owing to their somewhat costly nature. The products known by the name of petroleum naphtha have taken their place almost completely.

Coal-tar naphtha probably is the cheapest solvent known and as it is most extensively used by the manufacturer of India-rubber goods its history possesses much interest for him. Its origin is to be traced to the crude petroleum, or "rock-oil," which is a natural product of certain geological formations, sometimes rising to the surface through natural channels, forming springs, but chiefly obtained by boring. Rock-oil occurs in rocks or deposits of nearly all geological ages from the lower Silurian to the tertiary epoch, but is generally associated with clay shales and sandstones, frequently also permeating limestones. Petroleum is very widely distributed, yet there are a few localities especially noted for its occurrence, the principal of which are: Amiano and other places in the north of Italy; Baku, on the borders of the Caspian; the slopes of the

* Member British Society of Chemical Industry; Deutsche Chemische Gesellschaft, and American Institute of Mining Engineers.

Caucasus; Rangoon in Burmah, where a thick and viscous quality of semi-fluid consistency, like goose-grease, is found; the island of Trinidad, where it occurs in association with asphalt; and in portions of the province of Ontario, Canada. In the United States enormous quantities have been obtained from the States of Pennsylvania, Ohio, New York, West Virginia, and also from California. The occurrence of petroleum about the head-waters of the Alleghany river in New York and Pennsylvania was known to the early settlers. A stream in Alleghany county, N. Y., was named Oil creek in consequence of the appearance of oil in its banks, and later on the same name was given to a branch of the Alleghany river in Venango county, Pa. At points along the latter, springs issued from the banks of the stream, bringing up oil, which collected on the surface of the water as it stood in the pools below the spring. The inhabitants were accustomed to collect the oil by spreading woolen cloths upon the water and wringing them when saturated. Down the valley of this creek are also numerous ancient pits which appear to have been excavated for collecting oil, but by whom no one can tell. It was in 1854 that the series of discoveries began which have developed the great oil-region of Pennsylvania. The average daily production of this region alone, from the time of the first discovery of petroleum to January 1, 1874, was 10,852 barrels. The total product for the same time was 55,461,319 barrels.

The manufacture of naphtha from the crude petroleum, as well as other products of the same nature, dates from the time of the discovery of petroleum. The crude oil is refined by distillation and thus yields a number of very valuable products. The raw material reaches the distillery in large tank-cars which, on reaching their destination, are emptied into iron tanks, often of immense size, where the oil is allowed to settle so that the last traces of water and any sand may be removed.

The apparatus for manufacturing petroleum products consists of stills of various forms and sizes with worms, cooled by water, for condensing the vapors. The stills are either of cast iron, with wrought-iron bottoms, or are made wholly of boiler iron and hold from 1000 to 80,000 gallons. The smaller sizes are heated by one fire, the larger by several. Sometimes the stills are encased in

brickwork to prevent loss of heat. A convenient size to begin with is 12,000 gallons. The oil pumped into such a wrought-iron still or cylinder is first heated by steam alone, which removes the various grades of naphtha and the more volatile products which together constitute about 15 per cent. of the crude petroleum. The residue is then pumped into the cast-iron stills, heated by direct fires, where the distillation is continued and the successively denser products—kerosene, mineral sperm oil, light lubricating oil, paraffine or cylinder oil, paraffine wax and residuum—are first crudely separated. They are then purified, either by redistillation by themselves or by successive treatments with sulphuric acid, caustic soda and water. The lowest boiling products first obtained are purified generally by redistillation, products of gradually increasing boiling points and densities being thus obtained. These are:

PRODUCTS.	Specific Gravity.	Degrees Beaumé.	Boiling Points.
Rhigolene.....	0.625	...	65° F.
Gasoline.....	0.665	85°	120° F.
C Naphtha.....	0.706	70°	180° F.
B Naphtha.....	0.724	67°	220° F.
A Naphtha.....	0.742	65°	300° F.

After these, kerosene, mineral sperm oil, lubricating oil, paraffine oil and paraffine wax are successively obtained.

It will thus be seen that there are naphthas of three different grades of volatility and specific gravity. As a rule the C naphtha has the greatest solvent power, and is the easiest to evaporate out after it has accomplished the work of dissolving the gum; the other two require heat to drive them out. Naphtha leaves no stain when it is dropped on a sheet of paper and evaporated. The more volatile naphthas are extremely inflammable, while the less volatile are comparatively safe. Under certain conditions, where naphtha vapor evaporates and becomes mixed with air in certain proportions, an explosive mixture is formed which requires but the slightest spark to cause a frightful explosion. As the evaporation may take place to a greater or less degree at the ordinary temperature, great care should be taken to keep all containers of the liquid absolutely tight, and rigidly adhere to heating by steam heat and not by open fires.

RUBBER GOODS FROM FACTORY TO CONSUMER.

THE extensive rubber-manufacturer of the present day, especially when he has a variety of goods to sell, generally adopts a complex method of vending them, and the net prices actually obtained by him vary with the manner in which he is able to effect his sales. To start with, his goods are at the factory ready for distribution. He has his regular customers who take immense quantities at stated intervals, and the cost of handling is, in this particular branch of the trade, reduced to a minimum. The goods are simply way-billed through to their destination. This class of customers have a well-defined credit and meet their obligations with promptness,

and there is no risk with them except to furnish them with an article of the quality contracted for and on time. For this special advantage a price is fixed, which allows a margin to the jobber—for it is he who handles these goods—of 10 to 15 per cent. This naturally is the easiest and best way to sell goods.

But competition compels the manufacturer to resort to other means to dispose of his products. The "other concern" may have gobbled up the desirable jobber in a certain locality and here it is that the traveler has to get in his work. His expenses are naturally heavy and his salary large, for good men are in the end economical, while a

"stick" is the reverse, and the allowance made to the jobber has certainly to be added to meet the extra cost of handling. Still these goods can be shipped from the factory and many minor expenses be saved in this way. Credits are not so safe, however, as under the "jobbers'" plan, but they are reasonably so.

A third plan is to get rid of the goods in a retail way. Here comes in the risk in a pecuniary sense. Large sales have to be made to keep up the costly outfit of a metropolitan store, and many a manufacturer has long ago abandoned the idea of expecting these appendages to his business to be profitable. There are stores on Broadway, New York, in which it is claimed that 15 per cent. of the gross returns on all the goods sold at retail in them are expenses and 10 per cent. will crowd this result very closely in any one of them. The reason for their maintenance is simply the prestige—or the advertisement—it gives the company. New York city entertains at some time almost every fairly large dealer in the country and if the dealer can go home with a substantial impression of

the magnitude of the company with which he is already doing or will happen to do business, then all things being equal, he is likely to prove a steadfast and, therefore, profitable customer.

For a retailer to tell a customer just fresh from a week's sojourn in New York that his goods came from Plateglass, Bigfront & Co. is a small matter, but it is a lasting one, and to multiply it in many and various ways will redound to the good of the enterprising manufacturers who thus cast their bread on the waters. They cannot tell how it ever comes back to them except in their ledger footings.

The three ways mentioned are the chief methods by which the manager of a large concern disposes of his goods, and when one takes into consideration that the master mind must keep run of the factory, freight-rates, prices of rubber and a hundred other matters, major or minor, the wonder ceases to exist that there are so few men endowed with the required versatility and the powers of organization ample to carry on undertakings of the character here indicated.

THE LATE AUSTIN GOODYEAR DAY.

A Pioneer Rubber Manufacturer.

AUSTIN GOODYEAR DAY was born in West Springfield, Mass., in 1824. At an early age he displayed a remarkable bent for science and invention, which, combined with the qualities of intrepidity, energy, and practicability, rounded off a character to which the rubber world owes more than is apparent at the first glance. While his cousin, Charles Goodyear, became illustrious in his inventions, it fell to the lot of Mr. Day to bring the primary invention to a high stage of utility, to cheapen the manufactured product so as to bring it within the reach of the masses, and, to crown all, to invent a compound with such insulating qualities as to lead to its almost universal use.

At the age of seventeen young Day entered the rubber factory of Mr. Goodyear at Woburn, Mass., as correspondent and bookkeeper. Whether he succeeded in this calling history does not detail, but it is possible that faithful work as a scribe and accountant was of secondary consideration. He studied all the peculiarities of India-rubber, its physical and chemical properties, and kept up with all discussions with regard to the best processes of manufacture. When Mr. Hayward succeeded in the vulcanization of the first few yards of India-rubber young Day was around, and participated in the event. He remained in Mr. Goodyear's service for some time after, but finally became restless and roamed from factory to factory, his great ability securing him a position at will with any one engaged in manufacturing rubber. At that time he seemed to have a single idea—the perfection of the process of vulcanization.

In 1851 he reached the conclusion that if his services were in such request, they were worth more to himself, and he then began to explore the subject of treating rubber in connection with other substances—magnesia gums, resins, bitumen, etc.—and in this connection it is claimed for him that

he made the first hard rubber manufactured in this country.

Two years later he started on a line of investigation which added greatly to his reputation and fortune. At that time the only crude rubber fit to use was the Pará, other sorts being so adulterated as to be practically unmerchantable. The continuous demand for rubber goods had grown to such an extent that fine Pará had doubled in cost, reaching an ordinary price of \$1 a pound. Other sorts were selling for only 12 and 15 cents, and were dear at those prices. The great question then was what would the world do for rubber. Mr. Day invented a process for cleaning the inferior sorts, and in a year had perfected it to an extent that the Boston Belting Co. paid him money enough for the right to use the method to enable him to build a factory for himself on the site of the present factory of the Day company, at Seymour, Conn. In this factory he carried on the manufacture of hard-rubber penholders and pencils, relentlessly pursuing, however, his investigations and experiments in processes and combinations and the perfection of cleaning devices. The result in the latter was somewhat peculiar. In the first year he cleaned 55,000 pounds, and in the sixth year 500,000. The demand for the inferior grades quickened and eventually reached a price that interfered with profits, particularly as Pará in its turn came down to a reasonable figure. The process was disposed of and Mr. Day entered another field.

There seemed to be a gradual appreciation in the price of all sorts of rubber, and it was believed with good reason that as its manufactures enlarged the cost of the crude article would become great enough to interfere with the proportions of the industry. Mr. Day set as his goal, the invention of a compound which could be united with rubber. The science and energy of the rubber world is busy with



Austin G. Day

that problem to-day. Mr. Day found himself in the position of the learned scholar who undertook to study thoroughly the Greek alphabet, who discovered so much in it that he died regretting that he had not confined himself exclusively to *Epsilon*. Mr. Day made three thousand experiments, and accidentally discovered that which made him famous—Kerite. He found at first his ideas as represented in it rather crude, but he gradually built it up from the starting point. At that time the telegraph companies were using wires insulated in an inferior manner, for which the demand was not large. This was in 1867. Telegraph officials soon became attached, however, to Kerite, and used it. Then telegraphs in a commercial sense began to "boom" from newer methods of doing business among all classes, and the demand for insulated wire increased. Mr. Day saw what was coming and went to Europe restlessly investigating for two years all that would make Kerite excellent. He studied everything pertaining to the rubber and cable industries. He returned in 1872 with a knowledge of rubber compounds incalculable, and anxiously started in to organize the wire and cable factory at Seymour on a scientific and systematic basis. The business since then has been one of uninterrupted prosperity, and is a valuable legacy to the family of Mr. Day, in whose interest it is now carried on.

Mr. Day was happy in choosing able assistants. One of his lieutenants, Mr. De Wolfe, now at an age beyond work,

had an inventive genius in the way of mechanics. While Mr. Day could compound, it remained for Mr. De Wolfe to invent the machinery to carry on an entirely new industry. He also managed to get extraordinary superintendents, while his sales-agents were simply the best.

While Mr. Day produced the first hard rubber in America, he held his intended patents in abeyance in his search for a process of cleaning rubber, as without that only Pará could have been used. Afterward in his self-imposed multifarious duties he neglected the matter, allowing other minds to supplement his in this invention. He studied submarine-cable engineering, but it is a business on a mammoth scale, very technical in its nature, and has been left pretty well in the hands of the Europeans. For the manufacture of short lengths, for streams and bays, he equipped his factory and it has since done a great deal of armor work for other companies, while Kerite cables are to be found almost everywhere. The machinery for this, as well as for other branches of work, is chiefly peculiar to the factory, and has been improved from time to time by the Mr. DeWolfe referred to, and others following him.

Mr. Day reached nearly the age allotted to man, and as can well be imagined his life was a busy one and full of that success which comes from a character so well and industriously developed from a foundation in which the faculty of invention was the cap-stone. He died in 1890 at the age of sixty-six.

AMONG THE RUBBER FACTORIES.

A Continuous Record of Progress.

SO great has been the steady increase of demand for the products of the Boston Woven Hose and Rubber Co. that they have decided to erect a large brick factory with stone trimmings on Portland street, adjacent to the several buildings now occupied by them on Hampshire and Portland streets, in Cambridge, Mass. From a local newspaper, the *Chronicle*, the particulars which follow have been gleaned.

A strip of land comprising over 100,000 square feet was purchased some time ago, having a frontage on Portland street of about 100 feet and extending nearly 300 feet back to the Grand Junction railroad tracks. The broad canal, which once ran through the property years ago, has been filled in, and part of the foundation of the new building now rests where swimming and fishing were favorite pastimes of the young who are now "old boys." All the old wooden buildings which stood on the land have been removed and the work of preparing the foundation for the new has been going on about two months. The foundation is most substantial. More than 1500 piles were driven into the earth, and on these rests a solid stone wall four feet thick. The filling used contains considerable iron slag, from the old rolling-mill.

The brick-work of the new mill was begun on August 15, and is being rapidly pushed forward by a large force of men. The structure will have 10 feet bays and 23 feet spans, being 97 feet 4 inches wide, and 257 feet 4 inches

long, and will face the south. It will be known as a pilaster mill, built according to modern mill-construction with brick walls 32 inches thick. The roof, which will be of gravel, will be so arranged that any future time it can be changed to a floor, the girders serving as floor-beams, and other stories added.

A battlement tower 24 feet square, rising one story above the building, will be erected in the center and on the outside of the factory on the front, facing the present factory. In the tower will be the elevator, stairs, bell-tower and tanks for fire- and water-service. Adjoining and in front of the tower will be the engine-room, 30 feet square. A new and powerful engine will be purchased and the power will be driven through the belt tower to each room direct. The heating and ventilating apparatus will be models of efficiency and a large, modern steam fan-blower and engine in the basement will force cold air through flues to every room.

There will be nearly 300 Mullion windows, with transoms, 6 feet 10 inches wide and 12 feet high, insuring plenty of light, and lending a conspicuous attraction to the building, which will really be an ornament to that portion of the city. The plumbing, too, is worthy of mention and the closets will be placed practically on the outside of the walls, and encased.

The facilities for putting out fires and escaping in an emergency will be as nearly perfect as a modern mill can

have. There will be fire-escapes on each end of the building and bridges will connect the new and old factories at the second story. Automatic sprinklers will be placed throughout and the hydrants will be at convenient points on the walls. One of the best features of the fire-equipment will be a tank holding 50,000 gallons of water. It is calculated that with the engine a fire-service will be obtained equal to four steam fire-engines.

The interior rooms will be spacious and although but two floors will be occupied next fall and winter, it is expected that there will be nearly four times the present production, and nearly 300 more men and women will be employed. One half of the first floor will be used in making belting and a 75-ton belt press, made by the Farrell Foundry Co., will be put in. Two other smaller presses will also be placed on this floor, and the other half of the floor will be occupied by the hose-making department.

On the second floor will be the gasket-press, brass shop and tube departments. Here, too, will be carried on the manufacture of bicycle-tires, of which the company now turn out a great many yearly. In this connection should be mentioned another product of the company, which is of great value to riders of "pneumatic" bicycles—the "Pneumaticum" tire-mender [described in THE INDIA RUBBER WORLD for August].

Electric lights will be placed throughout the building and an especial telephone service will be introduced. There will be a telephone in each department connected with the office by a switchboard and with the Boston office as well. Furthermore, customers in distant places, even as far as New York, will be able to telephone directly to the department required. This system has been adopted by the company's Chicago and San Francisco houses.

The company intimate that no money will be spared to make the new mill as complete and desirable in every detail as possible, and it will cost more than \$100,000 when finished. Some time in the future a branch track will run from the Grand Junction railroad into the mill-yard, and the shipment of some goods will be made that way. One of the most interesting facts concerning this new venture is that it is wholly "home made." That is, the plans were drawn by the company's employes, four of whom are graduates of the class of 1890, Institute of Technology, under the direction of Superintendent Robert Cowen, the trusted "head" of the great works, and the construction of the new plant has not been given to any contractor, and skilled workmen are hired only when necessary. This being the dull season at the factory many employes, who would otherwise be obliged to take a vacation, have been kept at work on the new mill, which will be finished in time for them to go to work in the shops again. The draughtsmen are Messrs. A. D. Boss, of Willimantic, Conn., E. F. Bragg, of Taunton, Mass., J. O. DeWolfe, of Indiana, and T. W. Clarke, Jr., of Roxbury. The superintendent of construction is F. E. Currier, who directed the building of J. P. Squire & Co.'s establishment. Mr. I. H. Smith, the engineer, is also a prominent figure in the undertaking.

The officers of the Boston Woven Hose and Rubber Co.

are Theodore A. Dodge, of Boston, president; J. Edwin Davis, of Brookline, treasurer; Robert Cowen, of Cambridge, superintendent.

THE COLCHESTER WORKS "BOOMING."

THE Colchester Rubber Co. has never been in a more prosperous and flourishing condition than it is at the present time, says the Middletown (Conn.) *Penny Press*, which is published in a neighboring town. People who live in adjoining towns are surprised when they visit the shop to find that there is as much business done by one firm in the little town of Colchester. There are about 625 hands employed in the manufacture of the goods and twenty young men and ladies in the office as bookkeepers, stenographers and typewriters. The daily shipment of goods to all parts of the United States is immense. Under the management of President Watkinson, business at the Colchester Rubber Works is "booming" and improvements in the borough are being made daily. One would hardly recognize the place, especially around the station, so great has been the change within two years. Now immediately upon the arrival of a stranger he forms the opinion that Colchester is a smart little town and there is enterprise there. Mr. Watkinson certainly deserves congratulations in his success in making over the borough of Colchester from a sleepy little town to a wide-awake and prosperous hamlet.

"THE BACKBONE OF BRISTOL."

AT the factory of the National India Rubber Co., of Bristol, R. I., it is claimed, a greater variety of rubber goods is manufactured than at any other establishment in the country. The years which have elapsed since the incorporation of the predecessor of this concern—the old Providence Rubber Co.—embrace nearly the whole history of rubber manufacture. The National company has now a history of twenty-nine years on its own account. It has a capital of \$750,000, with nearly half a million surplus, and the plant cost \$1,200,000. In many branches of manufacture it has been a pioneer, and in other branches it has been a close competitor with the most advanced of the other concerns.

The plant at Bristol includes thirty-seven buildings, covering an area of eighteen acres. The nine engines have a capacity of 2000 horse power. The largest Harris Corliss condensing engine is 1200 horse-power. A pair of Harris-Corliss engines have 600 horse-power, and smaller engines are distributed in the machine shops and other points where power is needed, the company finding it more economical to carry steam long distances than to drive long lines of shafting. The total number of boilers is twenty two. In the boiler house are four Roberts and six Whittier boilers, all of which are six-foot tubular, and two-cylinder boilers. In the heater building at the north end of the works are five horizontal tubular boilers, built extra heavy for carrying steam at high pressure to be used in the heaters where the goods are vulcanized. In the pumping-

station on the wharf are two horizontal tubular boilers, and in the "Pará" room in the rear of the main works is one horizontal tubular boiler. At the company's reservoir in the southeastern part of the works and at the Mount Hope Lane pumping-station are two upright tubular boilers. The hourly consumption of water is 55,000 gallons. Sea-water for condensing is forced from the wharf pumping-station, by a Worthington pump, having a capacity of nearly a million gallons a day. Water for washing rubber is obtained from artesian wells, and the boilers are supplied with town water from the Kickemuit river at the wharf pumping-station. The company owns excellent harbor facilities with deep water. All heavy materials, coal, litharge, etc., are delivered in vessels and barges.

Unlike many companies, the business of the National India Rubber Co. is not limited to the production of boots and shoes. The variety of its goods covers the entire field—rubber clothing, mackintoshes, belting, packing and hose, sheets, door-mats, foot-balls and the infinite variety of goods known to the trade as druggists' sundries. The latest departure is the manufacture of insulated wire, which within a comparatively short time has become an important part of the works. The capacity of the department is \$150,000 per year.

There have been connected with the National company many men who have become eminent in the annals of the rubber industry. Edward M. Chaffee, who early united his fortunes with its predecessor, the old Providence company, was the inventor of the original grinder and it was put in use before the Goodyear vulcanization came into practice. A. R. Trotter, formerly connected with the company, and now living in Bristol at a venerable age, is known among the trade as a man of great knowledge and experience in the industry. From time to time employes of the company have taken out patents for various improvements, turning them into the company until the corporation has become a valuable repository in this respect. The present superintendent, Isaac F. Williams, devised a shoe-lining composed of a fabric having a complex surface, its inner face being partly in its normal fibrous condition, and partly rubber-surfaced. The National also first secured a last on which a rubber boot or shoe could be made with a close-fitting ankle and leg. Another valuable patent was one which rendered the flap-and-buckle overshoe impervious to the entrance of water or snow; a double flap being formed by reversed cuts in the exterior and interior fabric composing the vamp.

The Whittemore patent is another improvement belonging to the company. It provides the shoe with a binding shield at the toe, thus protecting the latter, while it binds the upper and the sole together by overlaying the seam at which both are united.

As above mentioned the National company make nearly everything in the rubber-goods line. The most notable exception is perhaps that they do not form a complete pneumatic tire in the works, but they make every part of it, and they are now considering the advisability of assembling the parts at the works. They make four and five grades of rubber boots and shoes—most companies being

content with half that number—and the capacity of the works is 55,000 pairs per day. The National people have for a long time carried on the devulcanization necessary for their manufactures, and the building in which it is done is at once large and well fitted up for this purpose.

In gossamers the company have at present more than they can do. It has been decided to introduce a special ladies' department, it being held that there are essential points of difference in the coat required for a woman and that for a man, in taste, design and general make up. A competent woman has been engaged to take charge of this department and special results are confidently expected. In rubber mats this company is well known as a pioneer, Mr. Chaffee devoting his energies to that line at an early date.

The officers and directors of the company, which employs from 1200 to 1500 operatives, and has a monthly pay roll from \$40,000 to \$50,000, are: Col. Samuel P. Colt, Bristol, president and treasurer; Charles A. Emerson, secretary; Isaac F. Williams, superintendent; Directors—Frederick M. Shepard, Charles Loewenthal, New York; John McAuslan, Providence, Joshua Wilbur and Samuel P. Colt, Bristol. As Bristol is a place of only about 8000 inhabitants, it can readily be understood that this industry is called the "backbone" of the village.

THE HARD-RUBBER WORKS AT AKRON.

THE works of the B. F. Goodrich Co., at Akron, Ohio, form the subject of a long descriptive article in a recent number of the *Republican* newspaper, of that city. The works were established on a small scale in 1872 by Dr. B. F. Goodrich, who had been engaged previously in the manufacture of rubber boots and shoes at Jamestown, N. Y. The first building, on the site still occupied by the company on Rubber street, was 50 by 100 feet in size and two stories high. Additions to this have been made until two main buildings are now occupied, each 220 by 50 feet and three stories high, and boiler- and mill-rooms 220 by 60 feet. In 1884 the B. F. Goodrich Co. were organized with an amount of capital which has reached \$750,000. The officers are George T. Perkins, president; George W. Crouse, vice-president; Richard P. Marvin, Jr., secretary; Henry C. Corson, treasurer, and Frank H. Mason, superintendent.

Some of the other details given by the Akron newspaper follow: Last year the business done amounted to about \$1,000,000. This year it is expected that the output will be even larger. The company own some good patents and make many specialties to order. The business is all done through advertising and correspondence, there being no traveling representatives or salesmen. Goods are shipped to Canada, Europe and other parts of the world.

The number of employes is given at 100 in the mill-room, where the rubber is prepared for the other departments; 40 in the hose department; 85 in the "hand department," where the lighter classes of goods, such as bicycle-tires, are made; 50 in the press-room, where the mold-work is done; 115 in the specialty department, and 7 in the shipping department. Including the employes of

the engine-rooms and electric-light department, there are altogether 450 in the establishment. The capacity of the works, it is stated, is larger than that of any other in the country devoted to the same line of production, and the fortnightly pay-roll amounts to \$8000. The Pará rubber used is received in 100-ton lots from New York. In the course of a year probably 500 tons are used, costing on an average 78 cents a pound, or \$780,000 in the aggregate. Power is furnished by one 500-horse-power and two 250-horse-power engines, and a 250-horse-power engine is required for the electric lighting.

It is stated that the manufacture of bicycle-tires has grown to be a very important feature of the work. The company make all the tires for the Gormully & Jeffrey Co., the Lozier Manufacturing Co., and several other important manufacturers. Although a comparatively new department it is one of the most important in the company's business. Other products are brushes, pump-buckets, car-springs, druggists' sundries, hose of all kinds, billiard-cushions and many articles of specialties. None of these particulars relate to the Goodrich Hard-Rubber Co., of Akron, the business of which is said to be on an equally large scale.

THE FUTURE OF THE GUTTA-PERCHA SUPPLY.

By M. Eugene Sérullas.

AT a recent meeting of the French Société d'Encouragement pour l'Industrie Nationale, M. Sérullas, who had been commissioned by the society to make some investigations of the state of the world's production of Gutta-percha, gave a summary of the results of his latest expedition, a report of which, translated from *L'Industrie Electrique*, follows:

After thanking the society for the pecuniary aid he had received, M. Sérullas proceeded to deal with the practical results of his mission from the point of view interesting to the electrical industry. At a future meeting he will briefly review the whole of his researches in the Malay peninsula.

The situation with regard to the important question of the supply of Gutta percha was serious. It resulted, on one hand, from the treatment of the trees which furnished the gum so indispensable in submarine telegraphy, and, on the other hand, to the rapidly-increasing difference between the supply and the demand.

The method practised by the natives for the extraction of the gutta consists in cutting down the tree, the new shoot of which, when it grows, does not yield gum until ten years old. When the tree (*Isonandra percha*) reaches the age of fifteen or sixteen years, the natives find the cutting of it scarcely remunerative. By felling all the trees anything like the right age which are met with, after having ruthlessly destroyed all the fully-grown ones, the native has for many years prevented the reproduction and multiplication of this valuable plant.

In 1854, when Gutta-percha was first introduced, many of the trees were already old; those which now survive are for the most part decayed, the repeated cuttings to which they have been subjected having doubtless diminished their longevity. There are still, however, half-a-dozen forests which the Gutta-percha hunter, thinking by mistake exhausted, has forgotten, and in these propagation has been freely going on; but situated in districts which were the first to be opened to civilization and not of much value from the native's point of view, they have no particular interest except as forests.

The crisis dreaded, with reason, by manufacturers of submarine telegraph cables, is close at hand. It can only be avoided by systematic cultivation, and by methodically utilizing the last existing resources.

The work which M. Sérullas has just accomplished will secure a sufficient supply for the future, by providing means of renewing dried-up sources, and starting plantations on a large scale in our colonies, and thanks to a new process of extracting gutta from the trees, he bridges over the time necessary for these plantations to be of use.

By the existing method of obtaining gutta, the trees, when large and full grown, are cut and destroyed, and can only be of use again after many years of growth, but M. Yungfleisch, in May, 1888, suggested to M. Sérullas a method of extracting gutta from the leaves.

The experiments made in Malay by this explorer have been conclusive as to the possibility of extracting the juice, coagulated and unchanged, from the tree, without sacrificing the trunk. The raw material which was brought to Paris has just been analyzed in the laboratory of M. Yungfleisch, under the direction and according to the advice of this expert. The results of this treatment by an entirely new process, have been as decisive as unforeseen. Not only is the extraction of the Gutta-percha from the leaves most economical, but the yield is enormous.

Any *Isonandra* tree possessed of leaves becomes *ipso facto*, fit to be operated on. Without touching the trunk a proportion of pure Gutta-percha can be obtained which, when dried, represents 8 or 9 per cent. of the weight of the raw material after dessication in an oven at a temperature of 100° C. (212° F.) It therefore follows that young trees as well as those which are so far decayed as to be useless under the native treatment, are capable of being very advantageously used, and a most satisfactory light is shown on the question. So long as the solution of this matter possessed the characteristic of being a very long operation, it was condemned to be dealt with by the Government; from now, however, private enterprise can step in. The plantations which will be started, and in which work the Government takes the initiative, can be worked in a comparatively short time, and French capitalists will be able to find in the utilization of the last resources, which exists in the Malay forests, an investment which will return them some day or other large profits. The example provided by the culture of the *Cinchona* in various foreign colonies, is significant.

Would a French company promoted for such an enter-

prise be able to obtain, in the heart of the savage country of Malay, a sufficient quantity of raw material for immediate commercial and industrial operations? Certainly, because leaving aside the exaggerated figures which have been published relative to the importation of Gutta-percha since 1843, and only taking into account those duly authenticated, one is bound to conclude that the number of trees still living amounts to over one million and a half. In fact, between 1843 and 1891, a period of forty-eight years, the electrical industry alone has consumed 10,360,000 pounds of gum, which can be proved to be *Isonandra percha*. By treating the felled trunk of a tree from twelve to fifteen years old, only three or four ounces of impure and wet Gutta-percha can be obtained. It is impossible for a thirty-year old tree to furnish more than nine ounces. At no period of its existence can a tree, if subjected to the native process, yield more than about a pound of gutta. After having yielded this maximum the tree dies away, and in a little time, very little or no more juice can be obtained from the trunk, its whole life goes to the branches and leaves.

During forty-eight years one tree can only be cut four times. It must be remembered that in the neighborhood of Singapore, Gutta-percha hunting was not started until about 1850. Taking it for granted that at the time of first cutting, every tree was in a condition favorable for the maximum yield, it is evident that each one has not been able to furnish up to now more than 1 lb. + 4 ozs. $\times 3 = 1 \text{ lb } 12 \text{ ozs.}$; to produce 10,360,000 pounds has, therefore, required more than 5,600,000 distinct trees.

Local statistics and actual exportations, all agree in confirming the statement of M. Sérullas, to the effect that more than one-third of this number of trees is still in existence, that is to say, at least 1,850,000. These remaining trees, it is true, may not live very much longer, and their condition is such as to render them almost useless in the hands of the natives; but if an adult tree, in full vigor, can furnish without harm to it, and for a length of time, some 200 pounds of dried leaves, every six months an old tree should at least have enough foliage to furnish two-thirds of this amount. A young tree of four or five years old, never gives less than about six pounds of dried leaves.

The leaves of a young tree, and of those recently cut down, are, curiously enough, larger and richer in gum than those of a large tree. The cutting of the branches, which at this age are few, seems in a short time to considerably increase their number. The trees easily lend themselves to grow as pollards. From a tree which to the native is valueless, *i. e.*, too old to permit of the usual treatment of the trunk, it is easy to gather a weight of leaves equivalent to $8\frac{1}{2}$ pounds of Gutta-percha; thus in a single day, by simply taking the leaves off such trees, five times as much gutta can be obtained as the natives could possibly secure by operations extending over half a century.

A young tree of four or five years old, can for its part by simply picking its leaves, be made to yield some nine ounces of gum, that is to say, just about as much as a thirty-year-old tree is capable of furnishing when its trunk only is treated. On the whole, there are, without doubt, in the Malay forests more than 1,500,000 trees, which will soon be permanently destroyed, and which, while of no value to the native, contain over 13,000,000 pounds of Gutta-percha. Even supposing that the stripped leaves will not be replaced by new ones, there is still a very satisfactory margin, and the enterprise should be a safe one. Gutta-percha of first quality is worth in the market of Singapore about 4s. per pound, and this gum would lose in the process of purification 10 or 15 per cent. of its weight, which loss is represented by water and various impurities such as sand, bark, etc. Under the present state of things, various commercial intermediaries make a profit which amounts to at least 3s. 4d. per lb., and adulterations are practised in the most barefaced manner.

By treating the leaves of the *Isonandra percha*, a French company would be able to furnish from this date a large supply of Gutta-percha for our electrical industry, of an excellent and homogeneous kind, and plantations destined to rescue our submarine telegraph industry from foreign monopoly, will not have to be planted fifteen or sixteen years before they can be of use. Four years from the date of their planting each of the young trees will be worth as much, in the hands of the European, as an adult tree when left to the natives of Malay.

AN ENGLISH CRITICISM OF M. SERULLAS.

From "The Electrician" (London).

THE question of the supply of Gutta-percha is a large and important one, of the deepest interest to all who are connected with the use of electricity; and any contribution to our knowledge of the supply, which is authentic and reliable, will be cordially welcomed. If M. Sérullas has discovered means for "the regeneration of exhausted sources" it goes without saying that his name and fame are assured. To the present writer, a few months ago, one of the highest authorities at Kew Gardens said: "We know extremely little about the trees which produce the Gutta-percha of commerce;" and this statement was fully demonstrated when he exhibited the specimens of

Isonandra preserved in the museum, which were a few dried leaves bearing legends dating from 1834 to 1838.

Authorities do not agree as to the origin of the name *gata*, *guettak*, *getah* or *guttah*; nor are they agreed to whom the honor is due of being the first European to bring to Western notice the elastic vegetable gum used by the Malays for weapons of war or vessels of domestic use. But all authorities agree that the present method of procuring this gum is wasteful in the highest degree, and has naturally resulted in denuding the forests in all easily accessible places of the Malay peninsula of their richest jungle tree. * * *

Gutta percha has been known to European commerce for sixty years; and for thirty-five to forty years there has been a large and increasing demand, which to-day is satisfied, as it was forty years ago, by the Chinese middlemen employing the Malay natives to range the jungle. * * *

Naturally all the forests in civilized and settled Malaysia have been exploited. In the three colonies that form the Straits settlements—Singapore, Penang and Malacca—the only *Isonandra* to be found are under thirty years old, too young to be worth felling for the yield. In the British protected States on the southwest of the peninsula the forests are similarly denuded of large trees. Pahang, on the northeast, has, since it came under British protection, offered a new field for "gutta-getters," and gangs of Borneo coast tribes have turned their attention to these Pahang jungles during the past two years, and have pursued their wasteful method with fairly good results. Borneo has all along produced the greatest quantity of Straits gutta, and its enormous extent of jungle country still promises for some years to keep up the supply. But naturally this must be gathered farther and farther from the coast.

Mr. Collins, late curator of the museum in Singapore, and Mr. Wray, curator of the Perak museum, have greatly contributed to our knowledge of the varieties of the *Isonandra*, and of the methods of procuring and preparing the gum for the market. Through the representations of the latter, the State Council of Perak a few years ago prohibited or considerably restricted the reckless felling of gutta trees in that State. The policy of *laissez aller* had prevailed too long in the three British settlements and the other Protected States; there were very few trees left, and these only young. No effort has been made anywhere throughout Malaysia to propagate or cultivate the tree.

M. Sérullas's name is familiar as a frequent contributor to French scientific journals on the chemistry of Gutta-percha. He has been at various times during the past ten years charged with a mission by the French Government to investigate the cultivation of gutta producing trees and other tropical produce, with the object, as far as regards gutta, of introducing the tree into Cochin China and Alge-

ria. Cuttings and seedlings were procured in and around Singapore, and their cultivation was attempted near Saligon, but the attempt was a failure. The *Isonandra* refused to grow beyond six degrees from the equator, and we have not heard of any Algerian plantation.

And here the writer may controvert two statements made in the extract from M. Sérullas's paper. First: It is true that the leaves and branches of a young tree are richer in coagulated milk than those of an old tree, but it has yet to be demonstrated that this coagulated milk of the young tree contains the adhesive, elastic, and insulating properties of the milk of the older tree. Secondly: A Gutta-percha tree is not valueless to a native from being *too old*. It is never too old to lend itself to "trunk working," by which we understand the process of felling and ringing.

About twelve months ago M. Sérullas formed a small company in Singapore to develop and work a process for the extraction, by chemical means, of the gum from the young branches, shoots, and leaves of the *Isonandra gutta*. The chemical process followed was probably that "suggested" to M. Sérullas by M. Jungfleisch. A factory was established, branches and leaves were gathered in the adjacent jungle, and up to July of last year seven or eight pounds of Gutta-percha were produced. This percha has been submitted to experts in England, and is found to be short, brittle, having in excess the *resinous* gum which is common to most tropical trees. The Singapore Gutta Extracting Co. promised to revolutionize the supply of that commodity. A report on the "local industry" from the Governor of the Straits settlements was considered by Lord Knutsford sufficiently important to be communicated to Kew, and was embodied, with other relevant matter, in the *Kew Bulletin* for September last.

It is to be hoped that M. Sérullas, M. Jungfleisch, and the Singapore Gutta-Extracting Co. will pursue their investigations. They are in the right direction; but much remains to be discovered before "French capital can make the utilization of the last resources of the Malay forests the object of a vast undertaking, capable of procuring for it great and immediate profits.

SOME EXPERIENCES OF A RUBBER JOBBER.

By W. L. Sage.

AT the late meeting in Boston of the Retail Shoe Dealers' National Association, the first after-dinner speaker announced by the toastmaster, A. S. Foster, was W. L. Sage, the rubber jobber of Boston. He said, as reported by the *Shoe and Leather Review*:

"I do not know, but I think if there is any man present in the room who is entitled to be classed as a shoemaker, I am. In the year 1826 my old grandfather started the shoe business in Rochester, N. Y. This was the very first concern that ever sent travelers west of Buffalo selling goods. My father followed him, and I followed in his footsteps. I was brought up as a shoemaker, and after leaving college in 1865 I went into the shoe business.

"If there is anything I ever was truly thankful for, it

is the training, the mental training and the physical training, that my dear old father gave me at that time. After I got through college he said to me: 'My boy, what are you going to do; going to study for a lawyer?' 'No, sir,' I answered. 'Going to be a doctor?' 'No, sir.' 'Well,' said he, 'I know you are not going to be a minister, you're not good enough.' I said: 'You're right, sir.' 'What are you going to do?' he continued. 'I am going into the store, sir.' 'Very well,' he replied, 'if you are going into the store you will have to recollect one thing, that you go in there as a boy from the street, and that I do not know you from the time you come in that door in the morning until you go out at night.'

"I was a young man twenty-one years old, had never

done a day's labor in my life, had always been brought up to think I was the son of a wealthy man and could take things easy. I went to work for \$400 a year. Before that time I had been getting \$20 a week pin-money, and when I got short I used to go to my dear old mother and she would make it up, and I was short most of the time, too. The first thing my father did was to put me at work stringing shoes. You gentlemen remember that at that time shoes used to come through in sixty-pair cases, and the first thing I did was to learn to string shoes and sweep out the store. Just as fast as I got so I could do anything as well as any man in the department I was advanced and my pay advanced, and not before. Many a time I have gone home at night and rolled and tossed in my bed, and heard the old gentleman laughing down-stairs. And my mother would say: 'Don't you think you are using him rather hard, your only son; hadn't you better let up?' But there was no let up, though every bone in my body ached with strapping cases. You will remember that at that time every case which went west of Buffalo had to have an iron hoop on the corner, and I used to put those on.

"So I am somewhat entitled to be considered a shoemaker. But as we gradually grow older we are not developed, perhaps, but we form likings; and a good many years ago I took a liking to that much-despised branch of the business, namely, the rubber business, and in my old house in Rochester, I was made the manager of that department, and when my father sold out I came to Boston.

"Now, I did not intend to say anything about rubbers, [laughter] but I want to say to you, gentlemen, that I know it is the custom and the habit to sneer at rubbers. It is the custom and the habit to say: 'Why don't you give us something that is good for something?' We give you, gentlemen, just what you called for. I will guarantee that in my mail (and we average perhaps a hundred letters a

day), there is not one letter out of 5000 which says: 'What is the best thing you have got?' but it says: 'What is the cheapest thing you have got?' Now, when you ask for the cheapest thing we are going to give you lampblack and whiting and resin, and everything else that will make the goods cheap. When you turn around and say: 'Give us good rubbers that will pull and stretch and hold,' and pay for them, we will give them to you; and we won't give them to you until you do ask for them.

"We are glad to see you gentlemen here as representatives of the trade. No gentlemen can get together in any one line of trade and rub their heads and ideas together without imparting knowledge to one another. We take more in by absorption than by reading and study.

"I want to say to you, gentlemen of the National Association, that if you never accomplish another thing, the fact of your establishing what is recognized throughout the United States, and almost throughout the world, the standard measurements, is a monument to your enterprise and your energy. There is not a manufacturer now that goes to work to make shoes but what consults that standard. It is the standard. There is no standard among us rubber fellows. I expect you will go for us next. But that is a very difficult thing to accomplish, more difficult than you have any idea of. You sell a woman a pair of shoes, 4 D, and you think a 4½ rubber ought to fit her. Perhaps it will and perhaps it won't. If it is a grain button boot it won't fit it. If it is a square edge it won't fit; if it is a bevel edge it will. Then you want to recollect that the lasts upon which the rubbers are made are put into a heater. They are all supposed to be made out of upland maple. Well, these dear countrymen get the maple out for us, and sometimes we find a good deal of swamp maple in it. That is put into a heater, 268° F. The heat will affect one piece of wood in one way and another piece in another."

LOW-GRADE RUBBERS AND THEIR USE.

From a Talk with a Leading Importer.

A QUESTION that has been discussed perhaps as often as any other is that of the comparative value of different rubbers for the manufacturer, but on no question is there a greater variety of opinion. Certain factories use only high grades of rubber, and when they attempt to inaugurate a change meet with instant disaster. On the other hand their neighbors use a considerable percentage of low-grade rubber and turn out marketable and durable goods. One of the largest shoe concerns in the United States uses a certain quality of African rubber, but no other rubber concern can be induced to touch it, for where they have experimented with it they have found it useless for their purposes. A number of years ago almost all rubber-shoe men were using a certain grade of African gums, but to-day only one concern uses that grade. Moreover this company make elegant goods and are using more and more of this rubber.

It follows that certain superintendents have discovered processes for treating the low-grade gums and getting good

results, that others are ignorant of. It is a pertinent fact, however, that as a rule all the companies in this country who use only the best grades of rubber are noted as the manufacturers of the best goods. Some of them, however, use the best of the low-grade rubbers with the greatest success. In the manufacture of such goods as friction for belting a high grade of Pará rubber would be entirely out of place. A better class of low-grade rubber, however, is exactly fitted for this work, and will if handled properly outlast and outstick the Pará rubbers. Where low-grade rubbers are used entirely, particularly in mechanical goods, the product looks well at first but rarely has marked lasting qualities.

This has given rise to the assumption that African rubbers are never thoroughly vulcanized; indeed, not long since one of the most practical rubber superintendents stated that it was impossible to properly vulcanize a low-grade African rubber. But this is rapidly being proved erroneous. If a proper amount of sulphur is added, and the cure continued long enough, the goods can be vulcan-

ized as thoroughly as if they were made from the best of gums. Years ago nearly all hard rubber was made from pinky Madagascar. This had a shrinkage of 25 per cent., and cost very nearly as much as fine Pará. But it assumed a peculiar polish under the buffing wheel and gave excellent satisfaction. It is what is known as prime pinky Tamatave. To-day manufacturers of the same goods are driven to the use of Pará, as pinky is now very scarce and seems to be growing more so every year.

Grades of rubber used for vulcanite to-day are fine Pará, Borneo and Nicaragua sausage. The poorer grades of rubber shrink all the way from 30 to 50 per cent., and this should always be carefully taken into account in figuring the cost. One would think that so simple a problem as this could easily be solved by every rubber-man. There are those, however, who never know the actual shrinkage in these gums. Perhaps this is why some of them claim that the grades of rubber they are using are economical, while others find they cannot afford to use them.

Within the last few years there has been a decided advance in knowledge concerning the manipulation of low-grade rubbers but manufacturers in general are possessed

of no carefully guarded secret concerning them. They contain various foreign matters, acids and alkalies, which necessitates the most careful shredding and washing. For this purpose perhaps nothing is better than the old-fashioned paper-engine or some mechanical arrangement similar to it that will allow the water to get into every part of the gum.

The examination of low-grade rubbers has been of some advantage to the rubber trade in that it has allowed them to protect themselves when for one reason or another the high grade rubbers have been forced above their legitimate value. It is said that a French rubber concern that has a reputation for good products is using as low grade as the Accra Flake for their best work. They treat the gum, their process being first a careful shredding and washing and then a long digestion of the shreds in a tank containing a small percentage of carbolic acid and ammonia. This may or may not be true; at all events the time undoubtedly will come when through the aid of chemistry the manufacturer of rubber goods will be able to supply many lacks in low-grade rubber and do what to-day he finds impossible to accomplish.

SUCCESS OF THE PNEUMATIC SULKY-TIRE.

By J. A. Sherman.

THE wonderful exhibitions of speed made by Nancy Hanks and Hal Pointer on the race-course give rise to wonder that the pneumatic sulky-tire should not have been brought forward sooner. The development of speed in the bicycle has really been in successive accidental steps. The old "bone-shaker" of a quarter-century ago was a terrible tax to every one except the adolescent, and its extended use was really impossible under the conditions of its make-up. The best minds abroad and at home worked towards the alleviation of the discomforts of its use, but they worked slowly. Rubber was the only solution, but rubber-men were busy coining money in a hundred other ways, and their brains were too much occupied to go into the mysteries of the bicycle. Bicycle-men did not understand the use of rubber in its better ways, and so the narrow rim of it on the wheel gave way slowly to a larger one, and after a while the cushion came. Speed was not thought of so much as comfort.

Carriage-makers saw the bicycle-tire, and used it very sparingly on buggies. They, too, thought only of comfort, without dreaming of rubber as a factor in speed. The pneumatic tire came along, made for comfort alone, but Dunlop's boy found himself flying, as it were, and a revelation came about. Quietly whole fields of "solids" and "cushions" were squandered in bicycle tournaments and France, England and America were ablaze with the new tire and its results. But this was hardly three years ago, so the carriage-men have moved, in this view of the case, quite promptly. They have had their peculiar difficulties to overcome, however. The bicycle-rider can pick his way, but the driver in a buggy has to take the road as it comes. Then the carriage-tire was an expensive article.

Sixty dollars for tires was rather extravagant for carriage use, and when it was found that they had to be renewed once every season their use remained limited. The only apparent way to overcome the extravagance of their use was to cheapen the compound, but the result can be foretold.

And so six years' experience with French and English, and, later, our own make of buggy-tires found that branch of the industry with little more progress to its credit than what was gained in the first three. But the question of speed was coming to awaken the followers of the trotting circuit out of their lethargy. The bicycle-rider had accomplished his mile in 2.11, and the question arose: Where is the horse? The bicyclists laughed and boasted that they would beat the horse. Maud S. and Sunol had retired from the turf, and apparently had no equals, and only two and a fraction seconds more had to be gained for the horse to be vanquished. Every crowd has its shrewd man, one who thinks deeply and logically, and the calculations of bicycle-men were upset by this leader among bicycle devotees. If a man can do so well with the pneumatic tire, why cannot the horse also? The leader was anathematized for his enterprise, but the pneumatic sulky-tire was born.

Budd Doble owned a trotting mare somewhat famous in her way, and with one of the new tires attached to a sulky built on bicycle lines, trotted a mile in 2.05½. The spectators were dazed, and Doble claimed that "Nancy Hanks" was without a peer in the equine world. Thinking men made up their minds it was the bicycle principle, and not the mare, that won the race, to all of which Doble strongly demurred. But as luck would have it, in a few days afterward, Hal Pointer paced a mile in 2.05½, breaking the record for his gait. This was proof too strong for

Doble, and the world now believes thoroughly in the rubber-tired sulky.

The ordinary narrow steel tire has little traction and cuts into the ground. Its friction reduces the speed of the horse to the extent of the energy used in overcoming that factor. Now the large rubber tire is yielding in its action, and with its broad surface it fairly glides over the surface, and its limited friction can be determined by the absence of all semblance to a rut in its wake. Apparent trifles may count a great deal when high speed is to be obtained. The meeting with even slight obstructions is a source of impediment in the speed of a horse. Every pebble gives the horse and driver a jar and detracts from the performance. It is the successive jars, one after the other that kill. With the bicycle-wheels the driver can give greater attention to driving also, and the small diameters are very accommodating to a certain class of horses that turn with some difficulty. Sunol turns so readily as to give him an advantage he will not have under the new dispensation.

The points in the new sulky-wheel are that the axles are ball-bearing, the tires as have been stated, and the diameter of the wheel is twenty-eight inches. The tire used is the Boothroyd, which is easily repaired, a much desired qualification in pneumatic tires. The mooted question is the size of the wheel. One class of turfmen claim that better results can be reached with a larger wheel; and this is a fact fairly conceded in mechanics under certain

conditions. The passenger locomotive has its six-foot driver and the freight three-and-a-half, but the locomotive moves on a straight track. The race-track is either circular or kite-shaped, and in the former case the tall wheel sways too much. The question is a nice one, but the wheel will probably not be more than four inches larger. Sporting-men claim that the horse owes about three seconds of his speed to the new sulky.

The point to rubber-men is where the new idea is to end. Will it bloom forth as the bicycle did, and come along so quickly as to hardly allow them a chance to catch on? The progress to date is that the Pope people are making the tires, and supplying them to the Caffrey Manufacturing Co. of Philadelphia, makers of sulkies. The demand for them so far is simply for trotting-horses on regular race-tracks. Only one or two of them are owned so far west as Chicago. In New England they are more common. Rubber-men so far claim that their extended use will be limited by their high cost and their liability to puncture. They say that our roads are not suited to them, and they will not become popular. This opinion, however, is not unanimous. A large manufacturing company in New England are debating seriously whether they will not commence to make them at once. They say the cost, \$100 per pair, is too much and will be reduced, a wheel-tire only weighing three to six pounds affording a pretty stiff margin for labor.

SELLING "FUTURES" IN THE RUBBER TRADE.

THE importer of crude rubber, as in the case with many other commodities, has by long experience, and the free use of the telegraph, learned to minimize his risks, natural to changes in the market and which could not possibly have been foreseen. A simple transaction in the sale of rubber—and if we accept the opinion of the anti-option partisans, the only just way—would be to order a quantity of rubber in Pará, have it shipped to New York, pass it through the Custom-House, place it in a wareroom and then, and not before, offer it for sale. Such a course is open to the objection that if rubber should decline ten cents before it reached New York a heavy loss would result, a risk too great for the careful importer. Again, he would not be sure of a market when it reached here, and then the cost of storage and shrinkage would begin. These two factors sometimes turn out to be expensive affairs, eating into imaginative profits at a rapid rate. Added to a decline in the price of rubber they would be so serious every once in a while as to drive most of the importers out of the business.

To avoid these risks and divest the business of harassing speculation, the importer, when he learns, through the cable of his correspondent, of a lot of rubber for sale at Pará, at once starts out to ascertain whether it can be disposed of readily. The manufacturers are canvassed and generally the sales can be made. The importer cables to Pará to close the sale, on which most likely he has obtained an option, and the profit on the transaction may be

estimated at once. The importer puts it this way to the manufacturer: He will deliver to him in October, or November, or some other month, so much rubber of a certain quality, at such a price. This is called the selling "futures." The rubber sold may be in the milk, and the "future" is calculated to expire about the time, in the course of events, it can reach New York. Usually "spot" rubber is worth less than "future," the price of the latter having storage charges, interest and insurance while in store, shrinkage, etc., as a factor in estimating its value.

The importer who can sell futures consequently makes, by some shrewdness, the total of these items, and it is these points which tend to make the "bear" rich, in everything, and which are so imperfectly understood by the public at large. In the transaction here detailed he has sold his rubber at a profit and pocketed every charge save that of transportation. The chances of a loss are now on the manufacturer, it is readily supposed, but the supposition is a hasty one. He has in his turn made large contracts for boots and shoes, or mechanical goods, due at a certain time, and he can tell months ahead how much rubber he will be compelled to have from time to time. He reasons thus: "I have sold to A. B. so many pairs of shoes; rubber to-day is worth 65 cents and the transaction will yield me a good profit, if rubber will only remain low until I can make up the order, and deliver it, say six months hence, as agreed. If rubber should go up I would lose. I might buy the rubber to-day, it is true, but it would cost me

trouble and interest on the investment; besides, I have not storage room to spare." About the middle of this soliloquy the importer happens along, offers him a lot of rubber in "futures" three months ahead, more or less, and a transaction is assured that under any other

plan would be full of trouble, and enormous risks. The importer and manufacturer are apt to leave to the tyro the speculative beauties of the situation, although all hands embark more or less on that uncertain sea which is always exciting, but not always free from disaster.

BRIEF ABSTRACTS OF RECENT RUBBER PATENTS.

AMONG recent patents issued by the United States Patent-Office, embodying applications of India-rubber or Gutta-percha, to a greater or less extent, have been the following. It is not practicable here to do more than to note the use of rubber in each case, with sufficient detail to enable those who are interested to decide whether or not to look into any particular patent more fully:

DRUGGISTS' SUNDRIES.

478,118.—Atomizer. Rhodes Lockwood, Boston, Mass.

In an atomizer, the combination of the following instrumentalities: the bottle, the collar fixed upon its neck, having a vent, the cap or stopper inserted in said collar, atomizing-orifices secured to said cap or stopper, the liquid-tube, extending down from said cap or stopper into the bottle, the air-tube, projecting outwardly from said cap or stopper, and the air-forcing device connected thereto, the annular flange, secured to the top of said collar at its outer edge, and the nasal nozzle, detachably placed within said annular flange and entirely enclosing the cap or stopper, and atomizing-orifices which are secured thereto, said nozzle being cut away or recessed at its lower edge, to astride the air-tube when placed within said flange.

478,703.—Syringe. Georgiana F. Miles, New York city.

A syringe provided with a nozzle and with a handle attached to the nozzle by an intermediate connection supporting the handle at a distance from the nozzle, said handle extending upward from its junction with the connection, approximately parallel to the nozzle.

479,937.—Spatula. Clarence W. Fox, Saugus, Mass.

A spatula composed of a blade of rubber having a broad thin steel core and a handle.

480,247.—Mode of Attaching Tips to Flexible Tubing for Gas. Alfred Caldwell, Providence, R. I.

A tube having a coiled-wire lining upon its interior and a cap upon its exterior, the outer end of the cap being reduced and provided with a short cylindrical portion of a diameter slightly greater than the interior diameter of the lining and adapted to engage with the end of the wire lining at one end and with a shoulder upon the end of the tip at the other end, the exterior diameter of the shank of the tip being slightly greater than the interior diameter of the lining.

480,787.—Injector or Insufflator for the Larynx, etc. William Scott, Leavenworth, Kas.

An injector for the throat, larynx, etc., comprising a casing for surrounding the tube of the instrument, a mirror pivotally attached to the casing, guides located at the sides of the casing, a rod running through one set of the guides and connected to the mirror, and also having a projecting inner end, and incandescent light carried by the outer end of the casing, conducting-wires leading from the light and through the opposite guides upon the casing, and a hollow handle carried by the casing and designed to contain a battery for connection to the wires.

MECHANICAL GOODS.

479,841.—Hose-Nozzle Holder. Cyrus R. Robinson, East Concord, N. H.

In a fire-hose support upon which metal brackets and straps are used for attaching the hose, a tubular connection upon which the brackets are mounted, an extension-rod mounted in

the tubular connection provided with a longitudinal groove adapted to receive a screw or pin projecting interiorly from its bearing, a spring locking device for securing the rod in an extended position, or vice versa, a suitable crooked tip or point threaded to the outer end of the extension-rod, and the insulated handles formed upon side bars connecting the hose-brackets.

480,643.—Packing. Thomas W. Welsh, Wilmerding, Pa.

A sheet, ring, or gasket of compressible or elastic packing material, having inner and outer ridges formed on its surface near the edges, a flat surface between the ridges, an opening or port through the flat part of the gasket, and inclosing ridges between the inner and outer ridges, which, with portions of the inner and outer ridges, form a complete inclosure for the port and prevent leakage from it to the space between the inner and outer ridges or to the atmosphere.

481,094.—Billiard-Cushion. Moses Bensinger, Chicago, Ill., assignor to the Brunswick-Balke-Collender Co., same place.

In a billiard-cushion strip, the combination, with the usual rubber body portion of a face-hardening strip composed of the material or substance known as "vulcanized fiber."

481,387.—Billiard-Cushion. Moses Bensinger, Chicago, Ill., assignor to the Brunswick-Balke-Collender Co., same place.

A billiard-cushion strip composed of the usual rubber compound, provided with a suitable face-hardening device and formed with a comparatively large recess, located about centrally of the back side of the strip, the flat and recessed portions of the back side of the strip being backed with canvas.

SADDLERY GOODS.

478,435.—Horseshoe. John E. Jarvis, London, England.

A composite horseshoe formed of a leather sole-piece or backing a rubber horseshoe-shaped cushioned on the lower face thereof and having its lower outer edge cut away or rabbeted in front of its heel portion, thus forming an outwardly-projecting flange, fitting snugly within said rabbet or groove and having its heels resting against the rear end walls thereof and its upper face engaging said flange.

479,790.—Rubber-Tread Horseshoe. Warren Davis, Crawfordsville, Ind.

A horseshoe consisting of the metal shoe proper channeled upon its under side between its edges and provided at intervals at its center with perforations and having its outer wall at intervals cut away and registering with nail-holes, the rubber tread fitted between the flanges and within the channel, and a securing device passed through the openings in the shoe and through the perforations registering therewith and formed in the tread.

479,912.—Horseshoe-Pad. Nicholas G. Mooney, New York city.

A protecting-pad for horses' hoofs, composed of a bottom layer of sole-leather, an intermediate layer of cork, and a top layer of absorbent material, cushioning-springs arranged in socket holes at the rear ends of the pad, covering-layers for the cushioning-springs, a retaining-catch attached to the front part of the pad, and elastic plates or calks attached to the under side of the base-layer at the front and rear ends of the pad.

748,633.—Stirrup. Ernest A. Peacock, London, England.

A stirrup having the tread, arch, and one side of metal and

the remaining side formed of an elastic band, looped at each end and passing over studs at the ends of tread and arch.

BOOTS AND SHOES.

480,097.—Rubber Shoe. Bernard Horovitz, Stillwater, Minn.

A low-cut rubber or overshoe having a bellows-like vamp or tongue-flap connecting the quarters of the shoe, a snow-excluder consisting of a hem-like strip of flexible material secured water-tight at the mouth of the shoe with its edge projecting forward and provided with draw strings or cords passing outward and forward through eyes in the quarters of the shoe, whereby when the shoe is in position and the strings are drawn tight and tied, the edge of the hem-like strip will be embedded in the socks of the wearer and the quarters will be secured over the bellows-like flap, making a water-tight and snow-tight joint.

481,324.—Heel-Plate. Edward F. Ayres and Timothy H. Foster, Danbury, Conn.

In a heel protector adapted to be contained within the heel of a rubber boot or shoe comprising an approximately V-shaped plate provided with perforations and depending studs or wearing points and having the ends connected by a bar provided with dovetailed grooves adapted to act in the capacity of retaining points, and a spider or Y bridge formed of ribs which rise from approximately equidistant points on the upper surface of said plate and unite at the center.

BICYCLE- AND VEHICLE-TIRES.

479,202.—Pneumatic Tire. Frank H. Bolte, Milwaukee, Wis., assignor of one-half to Parker H. Sercombe, same place.

A method of manufacturing pneumatic-tire tubes, that consists in shaping a previously formed tube of caoutchouc upon a ring-like mandrel, enveloping the tube in a reinforce of fibrous material previously stretched and treated with caoutchouc, withdrawing the tube from the mandrel, and joining its ends, injecting the tube with a material expansible under heat, then vulcanizing in a suitable mold, and afterwards securing a protective covering on the vulcanized product.

479,203.—Pneumatic Tire. Frank H. Bolte, Milwaukee, Wis., assignor of one-half to Parker H. Sercombe, same place.

A pneumatic tire comprising an endless tube of caoutchouc vulcanized in one piece with a practically-continuous strip of fibrous material that is spirally disposed and so wound as to overlap about one-half of itself throughout its length and thus form two thicknesses at all points.

479,206.—Vehicle-Wheel. Emmitt G. Latta, Friendship, N. Y.

A pneumatic tire consisting of an inner inflatable air tube and a flexible envelope having overlapping edges, one of said edges being provided at intervals with studs or projections and the other with openings which receive said studs or projections, whereby the overlapping edges are united and positively held against longitudinal displacement on each other.

480,319.—Pneumatic Tire. Finlay Sinclair, Coventry, England, assignor to the Pneumatic Tyre and Booth's Cycle Agency, Limited, Dublin, Ireland.

In a pneumatic tire, the combination, with an inner expansible or inflatable tube, of a tubular non-expansive confining jacket of canvas, the ends of which are secured together by a flap or tongue from one overlapping and secured to the other.

480,565.—Pneumatic Wheel-Tire. Karl Lehmann, Berlin, Germany.

A non-circular tire, comprising an inner air-tube, having the reëntering sides, and a heavier tread portion, embracing the outer portion and sides of the tube, and having inwardly-projecting edges to enter the sides of the tube, and shoulders adapted to bear upon the rim.

481,083.—Bicycle-Tire. Arthur A. Kupfer and Herman C. Kupfer, Providence, R. I.

In a pneumatic tire, the combination therewith of an endless

expansible tube secured to the upper inner portion thereof and collapsed against this portion of the tire when not in use and independent means for expanding the same.

481,197.—Pneumatic Tire. Charles H. Roth, Cincinnati, Ohio.

A wheel-tire inflated with air, a valve consisting of a chamber secured to the rim by a shoulder on the chamber within the rim and a nut exterior to the rim, a spring-case screwed to the chamber, having a valve seat on its inner end, a valve, a stem, and a nut on the stem capable of drawing the valve against its seat.

481,323.—Pneumatic Tire. Adolphus F. Wyman, New Bedford, Mass.

A pneumatic tire having its interior provided with a number of thin pieces of rubber adapted to have free movement within the interior as the wheel revolves.

478,564.—Elastic Tire for Vehicle-Wheels. Frederick H. Bullard and Frank Harrington, Chicopee, Mass.

In a tire for a vehicle-wheel, a hollow ring of elastic compressible material, and a spiral spring having the convolutions thereof separated and inclosed and extending around within the tire-ring and the said convolutions having a winding of suitable fabric.

479,201.—Velocipede-Wheel Tire. Frank H. Bolte, Milwaukee, Wis., assignor of one-half to Parker H. Sercombe, same place.

The combination, with a wheel-rim having a concave outer periphery, of an elastic tire in which that portion thereof adjacent to the wheel-rim is provided with a seat for the same, this seat being the result of forming circumferential recesses in the body of the tire on opposite sides of its radius eccentric to the center of said tire in transverse sections at any point of its circumference.

479,851.—Spring-Tire. William C. Smith, Goshen, Ind.

An elastic tire having a concave inner face with the felly having a groove or seat therein, a series of springs interposed between the felly and tire and seating in the concavity of the latter and in the groove or seat of the former, and a band or belt of flexible material within the concavity of the tire and extended downwardly into the seat of the felly at its side edges.

479,946.—Vehicle-Wheel. Emmitt G. Latta, Friendship, N. Y.

A wheel-rim having a concave or grooved face, an inflatable tire consisting of an inner air-tube, a removable envelope inclosing the air-tube and having meeting edges located within the concave face of the wheel-rim, and a detachable lacing-cord connecting the meeting edges of the envelope and adapted to be removed from the openings in the meeting edges for obtaining access to the air-tube, the lacing-cord being arranged within the concave face of the rim and the tire being capable of removal from the ring without unlacing its envelope.

481,435.—Tire for Cycles. Thomas H. Stone and Harvinton Corser, Birmingham, England.

A felly having inwardly turned edges, an elastic tire formed with shoulders, comprising a thickened solid portion and the tubular portion, said solid and tubular portions formed integral with each other, the tubular portion adapted to seat within the felly, the inwardly turned edges of which engage the shoulders of the tire.

No. 481,340.—Rim and Tire for Wheels. Charles E. W. Woodward, Chicopee, Mass., assignor to the Overman Wheel Co., same place.

An arch-shaped rubber wheel-tire having the edges of its side walls made flat in cross section and beveled or inclined toward each other at an angle of about forty-five degrees, a wheel-rim having its bed constructed with two annular seats made flat in cross-section and inclined toward each other in conformity with the inclination of the edges of the tire.

